

FIRST RECEIVER AWARENESS/OPERATIONS AND DECONTAMINATION FOR HEALTHCARE



2013

CALIFORNIA OFFICE OF EMERGENCY SERVICES
CALIFORNIA SPECIALIZED TRAINING INSTITUTE



Cal OES

GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

ACKNOWLEDGMENTS

First Receiver Awareness/Operations and Decontamination for Healthcare, is intended to support “hands-on” training from qualified instructors who are experienced in Hazardous Materials response and Hospital Operations.

This course would not be possible without the knowledge and expertise of several dedicated instructors who, over the last 20 years, have taught hundreds of hazardous materials response courses from the awareness level to the specialist level.

Chief among those instructors are:

1. Paul Henlin, Emergency Management Coordinator/Instructor II (CSTI Retired);
2. Matt Krinsky, Emergency Management Coordinator II, current Course Manager for First Receiver Awareness/Operations and Decontamination for a Healthcare;
3. Jack Fry, Captain II, Los Angeles City Fire Department (Joint Regional Information Center);
4. Eric Angle, RN, MICN, Sutter Hospital, Roseville, CA.,
5. Bill Wennhold, of Mark Twain Medical Center, San Andreas, CA., one of CSTIs most prolific and motivational Instructors.

These Instructors, and the others who have been such ardent supporters of CSTI and its goals, have been the true backbone for the outreach programs offered throughout California and elsewhere. Their efforts are greatly appreciated.

Subject matter experts worked hand-in-hand with Paul Penn, of Enmagine Inc. Paul’s support and extensive use of HazMat for Healthcare curricula was invaluable in the production of the 2013 revision.

HAZARDOUS MATERIALS FIRST RECEIVER AWARENESS/OPERATIONS AND DECONTAMINATION FOR HEALTHCARE

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First Receiver Awareness/Operations and Decontamination for Healthcare: Participant Guide May be used for training, not for commercial use.

Citation of the California Specialized Training Institute (CSTI) as the source of these materials is appreciated.
California Specialized Training Institute, 2013 CSTI

CALIFORNIA SPECIALIZED TRAINING INSTITUTE

First Receiver Operations and Decontamination for Healthcare

Draft Schedule



Day/Time Subject

Day One

0800-0830	Administration and Overview
0830-1030	First Responder Awareness, Recognition and Safety
1030-1200	Safety, Isolation and Notifications/Directed Self Decontamination
1200-1300	LUNCH
1300-1400	Overview of Incident Command
1400-1500	Identification and Hazard Assessment/Incident Action Plans
1500-1700	Personal Protective Equipment/Donning and Doffing Exercise

Day Two

0800-0830	Review and Questions
0830-1000	Hazmat Countermeasures
1000-1200	Decontamination, Disposal and Documentation
1200-1300	LUNCH
1300-1530	Field Exercise
1530-1600	Equipment Restoration
1600-1630	Outreach Instructor Information
1630-1700	Exam, Comments, Questions, Wrap up

COURSE DESCRIPTION

COURSE OVERVIEW

The overarching goal of this course is to provide hazardous materials First Receivers with the knowledge and skills to become competent in hazardous materials in a healthcare environment, who have a high regard for safety. The intended outcomes for this course are to ensure that participants will be able to identify, inventory and analyze the hazards and risks involved in an incident and take appropriate action, either through direct intervention or by contacting the responsible supervisor with recommendations for minimizing risk; assist in the preparation and development of components for event-specific and site specific plans that involve personnel safety; implement the elements of personnel monitoring to protect hazardous materials responders' health and safety; develop appropriate forms of written and oral safety communication for incident planning and to ensure that on-scene personnel receive critical information about the specific hazards and risks involved in hazardous materials incidents; assess on-scene decontamination procedures in order to protect responder health and safety; and plan a safe hazardous materials response that is consistent with the emergency response plan and the organization at a Healthcare Facility.

The content for this course describes some of the tools and procedures a First Receiver must be familiar with to carry out the responsibilities of possible positions; explains how laws, regulations, plans, policies, and standard operating procedures play an important role in ensuring safety during responses to hazardous materials incidents. In addition to addressing the outcomes and content described above, this course incorporates many opportunities for asking questions and discussing various safety topics. Small-group and independent exercises are structured to reinforce key points. In particular, the class is divided into groups of participants

SCOPE

This course in hazardous materials response for the Assistant Safety Officer complies with requirements for the state of California's Hazardous Substances Incident Response Training and Education Program (Government Code Section 8574). This code requires the California Emergency Management Agency to present to field responders approved training classes, taught by trained instructors, in hazardous substance response. These training classes are to be provided through outreach programs and are to certify participants who have completed these training classes. This training is also mandated by the Occupational Safety and Health Act, Title 29, Code of Federal Regulations 1910.120(q) and the California Code of Regulations Title 8–Section 5192(q). The regulations covering the requirements and course contents are contained in the California Code of Regulations Title 19–Section 2520.

TARGET AUDIENCE

The target audiences for this course are Healthcare workers to include, registered nurses, environmental service, security, fire service, law enforcement, emergency management, emergency medical services, hazardous materials, or any other individuals who, in the course of carrying out their job, may be assigned to the incident at a healthcare facility.

PREREQUISITES

This is an entry level course for Awareness and Operations, no prerequisites are required.

DURATION/COURSE LENGTH

This course has been developed as a 16-hour, instructor-led training delivered over two days.

COURSE DESCRIPTION

REQUIRED MATERIALS/FACILITIES

- Seating and work stations for up to 30 participants
- Laptop computer, projector, and screen
- Instructor Manual and CD with Power Point presentation (1 for instructor)
- Participant Guide (1 for each participant)
- Flip charts and markers for safety briefings
- ICS forms (201: Incident Briefing, 202: Incident Objectives, 206: Medical Plan, 208: Site Safety and Control Plan, and 214: Unit Log)
- Personal Protective Equipment used in a Healthcare Environment.

TESTING AND CERTIFICATION

Course completion is based on the final exam with a minimum score of 70 percent and participation in class exercises. Once participants have successfully taken this course, California Specialized Training Institute (CSTI) issues a Certificate of Completion.

REFERENCE LIST

This section provides the source material upon which this course is based.

Dashiell, Thomas R., Patrick, William C., Sidell, Federick R.. 2003. Jane's Chem/Bio Handbook. Jane's Information Group.

Henry, Timothy V. 1999. Decontamination for Hazardous Materials Emergencies, Delmar Publishing
<http://www.amazon.com/Decontamination-Hazardous-Materials-Emergencies-Timothy/dp/0766806936>

National Fire Protection Agency (NFPA). NFPA Form 704 Hazard Identification System.

National Institute for Occupational Safety and Health (NIOSH). 2005-149. Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services.

Occupational Safety and Health Administration. November 1983. Code of Federal Regulations, Title 29, Part 1910.120; Hazardous waste operations and emergency response <http://www.gpoaccess.gov/CFR>

State of California Office of Emergency Services. 2007. Firefighting Resources of California Organized for Potential Emergencies (FIRESCOPE). <http://www.firescope.org/>

U.S. Air Force. 2000. Air Force Instruction 90-901: Operational Risk Management. <http://www.mitre.org/work/sepo/toolkits/risk/policies/files/afi90-901.pdf>

U.S. Army. January 2000. Soldier and Biological Chemical Command (SBCCOM). Guidelines for Mass Casualty Decontamination during a Terrorist Chemical Agent Incident. http://www.chem-bio.com/resource/2000/cwirp_guidelines_mass.pdf

U.S. Coast Guard. 1999. Commandant Instructions 3500.3: Operational Risk Management. http://www.uscg.mil/directives/ci/3000-3999/CI_3500_3.pdf

COURSE DESCRIPTION

REFERENCE LIST CONTINUED

U.S. Department of Homeland Security. May 23, 2005. Universal Task List, Version 2.1. http://www.ojp.usdoj.gov/odp/docs/UTL2_1.pdf <http://www.fema.gov/pdf/emergency/nims/im-job-titles.pdf>

U.S. Department of Transportation (DOT), Transport Canada (TC), Secretariat of Transport and Communications of Mexico (SCT), and collaboration with CIQUIME (Centro de Informacion Quimica para Emergencias) of Argentina. 2008 Emergency Response Guidebook.

ADDITIONAL REFERENCES

OSHA Best Practices for Hospital Based First Receiver Victims (OSHA 2005)

Patient Decontamination for Hospitals (Excerpts) (OSHA 2005)

2012 Hospital Joint Commission Standards 02.02.05(5) & 02.02.07(7)

EVALUATION STRATEGY

This course uses a Level 1 evaluation strategy in the form of a questionnaire to determine learners' reactions to the course and a Level 2 evaluation strategy in the form of a multiple-choice pre/post test to assess learners' proficiency in the knowledge and skills presented.

NOTE TO INSTRUCTORS

It's YOUR course! You may substitute videos, case studies, photos, graphics, etc. (That do NOT change the content or meaning of this program) to suit your needs and specifically address your audience.

This program is presented as a generic basis of what must be covered in your classes.

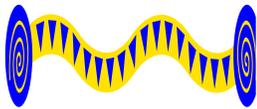
Participants Manual: Chapter 1

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter provides an overview of the course and introduces the First Receiver as a critical link in the medical care of victims, discusses Hazmat emergencies and discusses regulations that cover First Responders and Receivers.



Time	Instructor/Participant Ratio	Method of Instruction
.5 hours	1/30	Facilitated Seminar



Terminal Objective

At the end of instruction for Chapter 1, participants will be able to determine the magnitude of the Hazardous Materials problem that may develop at a hospital or medical facility.



Enabling Objectives

This chapter's enabling (performance) objectives are to ensure participants will be able to:

1. Understand who needs to be trained at the awareness and operations level.
2. Describe some of the risks a First Receiver may face.
3. Describe the need for safety for the First Receiver.
4. Recognize the wide range of dangers from hazardous materials

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResA1a 1.1

Establish procedures for assessing an immediate incident scene

ResB1a 2.1

Develop and implement training program for on-site incident management



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)



Supporting Materials

- OSHA Best Practices for Hospitals
- Hazmat Tactical Operations and Priorities

Activities

- Easel Charts for Brainstorming



Slide 1.1

Introductions of instructors, Housekeeping (Logistics) issues.

Course contents: handouts, power point presentation, evaluations, post tests.

Introductions of participants:

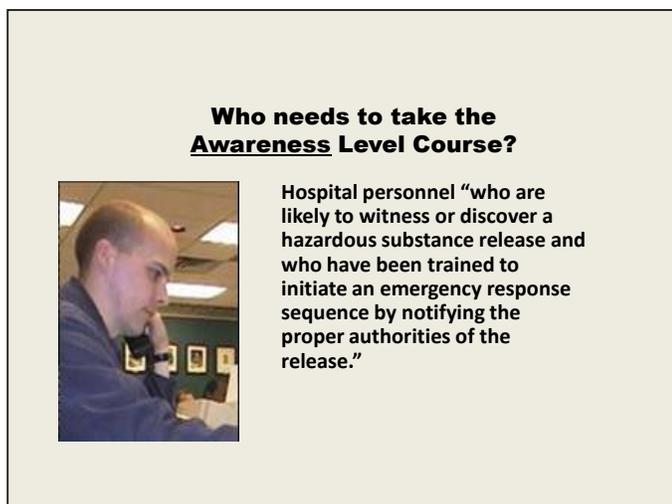
- a. Ask job classifications
- b. What do they expect to get out of the class?

IV. Show ER segment (Warner Bros, Exodus): “call from dispatch”



Slide 1.2

Video: Hospital alerted of fire and explosion by phone



Slide 1.3

The words in quotes comes from the HAZWOPER standard definition for the First Responder Awareness level ((q)(6)(i)

Ask who within the hospital may have potential contact with a Haz Mat incident?

Who needs to take the Operations Level Course?

Hospital personnel "who **respond** to a Haz Mat release as part of the initial response in a **defensive action** and **contain the release** from a safe distance."



Slide 1.4

Hospital implication: those who will have responsibilities to take defensive actions with hazardous materials from a defensive standpoint. Such as performing decontamination.

Goal is to have enough people trained at the Operations Level to have a minimum of 4-6 people on duty all the time to make up a Decon Resource Team. Will need to train a percentage of Environmental Services /

Housekeeping, Plant Operations / Engineering / Facilities, Security, and ED to have enough people trained. Training only ED personnel will result in a clean patient and an empty ED. Design program for 2 AM and work your way back.

Course Requirements

- First Receiver Awareness Level 4 Hours
- First Receiver Operations Level 16 Hours
- 100% Class Attendance
- Complete Certified Exam with 70% or better score

Slide 1.5

These are the requirements for certification in both the Awareness and Operations level courses.

Regulations



The Occupational Safety and Health Administration (or its state equivalent) has a mandate to ensure that employers provide a **safe and healthful workplace**.

The primary standard applicable to this program is called Hazardous Waste Operations and Emergency Response (**HAZWOPER**).

Slide 1.6

It is mainly the OSHA regulations that prompt us to provide training and personal protective equipment for our employees.

The HAZWOPER regulations state the levels of training, what must be included, minimum hours (exception- no minimum hours for Awareness training- ours is 4 hours), and who should be trained.

Regulations (cont.)



Training categories in the Emergency Response section of the HAZWOPER Standard are:

- First Responder-Awareness
- First Responder-Operations
- Hazardous Materials On-Scene Commander
- Hazardous Materials Skilled Support Personnel

DEFENSIVE

Slide 1.7

There are other OSHA standards that are applicable too, such as the Respiratory Protection Program.

This is primarily a worker safety (staff) training program but also helps to protect patients visitors, the community, and the environment.

Awareness Objectives

- Define Hazardous Material
- Identify risks and problems that can occur in a Hazardous Materials Incident
- Recognize a Hazardous Materials Incident



Slide 1.8

These are the objectives for the Awareness Level of training.

Awareness Objectives



- Identify Characteristics of a Chemical
- Describe a Safe and Effective Response
- Understand how to make Proper Notifications
- Describe how to Isolate the Scene and Deny Entry
- Describe how to Conduct "Directed Self Decontamination"

Slide 1.9

Awareness objectives continued

Awareness & Operations Objectives

Understand the role of Awareness Level personnel in the overall response



AWARENESS **OPERATIONS** **COMMAND** **TECHNICIAN**

Slide 1.10

It is important you know what your role is in a hazardous materials incident that occurs at your facility. This may be internal or external.

Definition of a Hazardous Material

- There is no one definition.
- OSHA definition: Hazardous Chemical: Any substance to which exposure "results or may result in adverse affects on the health or safety of employees:" or "any chemical which is a physical hazard or a health hazard." 29 CFR 1910.1200 (c)

Slide 1.11

There are many different definitions of a Hazardous Material. OSHA's Hazard Communication Standard is as listed above. Department of Transportation (DOT) has another one.

Bottom line is what OSHA says: "results or may result in adverse affects on the health or safety of employees." or "anything that can get out of its container and bite you on the bottom."

OSHA Hazwoper Regulation

- Provides Training Requirements
- General Response Requirements
It's the foundation of this course
- Title 8 California Code of Regulations
Section 5192
 - California Regulation
 - Almost Identical to Federal Regulation
 - Applies to both public and private sector employees

Slide 1.12

This course is set up for the Awareness and Operations Level. This level of training provides defensive actions. Higher levels of training such as Haz Mat Technician are offensive in posture. They can go into the middle of a haz mat situation and plug holes or make repairs.

In California we follow Title 8 California Code of Regulations section 5192.

What does the regulation state?

- "Hazardous substance" means any substance designated or listed under (A) through (D) of this definition, exposure to which results or may result in adverse effects on the health or safety of employees:
- [A] Any substance defined under section 101(14) of CERCLA;
- [B] Any biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring.
- [C] Any substance listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101 and appendices; and
- [D] Hazardous waste as herein defined.

Slide 1.13

Note section B which can include infectious materials, blood borne pathogens, and bioterrorism. This section was ignored by many responders but has special meaning for healthcare.

What does the Regulation State?

IN OTHER WORDS...

Any Substance Posing
an Adverse Effect on Health
Any CERCLA-Defined Substance
Any Biological or Disease Causing Agent
Any DOT-Defined Haz Mat Substance
Any Other Substance Defined
in 29 CFR 1910.1200

Slide 1.14

Superfund is the name given to the environmental program established to address abandoned hazardous waste sites. It is also the name of the fund established by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA statute, CERCLA overview). This law was enacted in the wake of the discovery of toxic waste dumps such as Love Canal and Times Beach in the 1970s. It allows the EPA to clean up such sites and to compel responsible parties

to perform cleanups or reimburse the government for EPA-lead cleanups. Hazwoper covers requirements for both emergency and non-emergency hazmat response.



Hazwoper Requires Employers To

- Plan for response and cleanup
- Train employees
- Follow basic response requirements

Slide 1.15

Here are some basic requirements for employers as it relates to hazardous materials.

Classifications of Hazardous Materials
(OSHA Hazardous Waste Operations and Emergency Response Standard 29 CFR 1910.120 [Title 8 §5192 CCR])

These are lay terms !

- Chemicals that cause cancer
- Biohazards or infectious materials
- Chemicals that can burn the skin or eyes on contact

Slide 1.16

Hazardous materials are classified according to properties they have. We will cover the this more in Chapter 2

Here are the types of hazards in lay person's terms.

- Radioactive materials
- Chemicals that can cause violent chemical reactions
- Poisons
- Unknown chemicals
- Chemicals that can catch fire or explode

Slide 1.17

Classifications continued

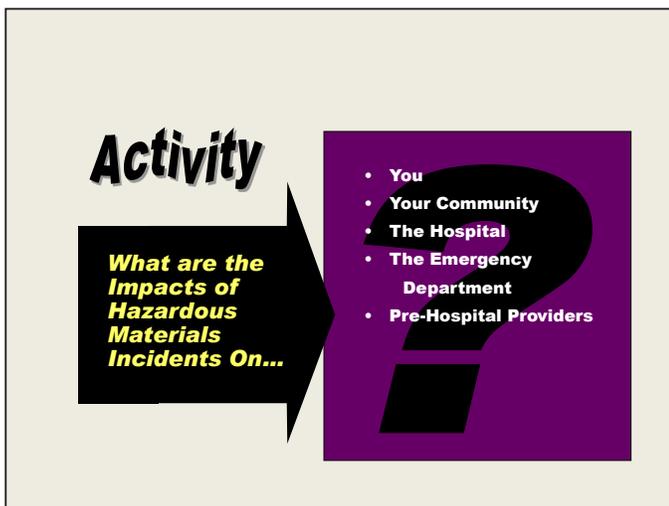


Slide 1.18

In hospitals, we may have to deal with Internal and External incidents.

An Internal incident would be a Haz Mat spill that originates in the facility.

An External incident is a Haz Mat spill that occurs outside the hospital but affects it due to contaminated victims coming into the hospital or there is a toxic plume that blow over the hospital.



Slide 1.19

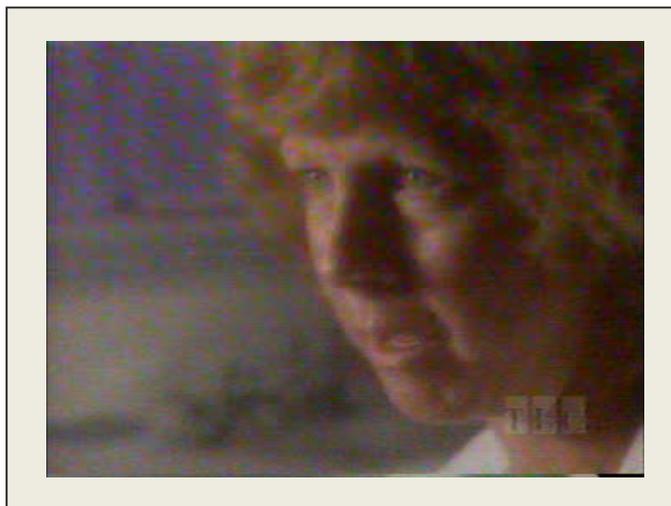
Set up video and have students address impacts to the following

- You
- Community
- Hospital
- Emergency Room
- EMS



Slide 1.20

Discuss ER episode thus far in relationship to You, Community, Hospital, ED, EMS



Slide 1.21

Gloria Ramirez incident Riverside, California

Or local example specific to class

Basis For Success

The C's

- Communication
- Coordination/Consideration
- Control
- Common Sense

Slide 1.22

These concepts for a successful emergency outcome should have come from the discussion in the previous exercise.

Review them as the results that should be expected.

Supporting Material

Welcome and Course Overview

Main Points

- Introductions and Welcome
- Course Overview
- Key Administrative Announcements
- Need for First Receiver Training
- Class Groups and Teams

Supporting Material

First Receiver Awareness.

29 CFR 1910.120(q)(6)(i), Title 8 CCR 5192(q)(6)(A)

General: “(6) Training. Training shall be based on the duties and function to be performed by each receiver in an emergency response organization. The skill and knowledge levels required for all new receivers, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response shall be given training in accordance with the following paragraphs”:

FRA: “(i) First Receiver Awareness level....individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the authorities of the release. First receivers at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas”:

Competencies:

- “(A) An understanding of what hazardous substances are, and the risks associated with them in an incident.
- (B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- (C) The ability to recognize the presence of hazardous substances...
- (D) The ability to identify the hazardous substances, if possible.
- (E) An understanding of the role of the first receiver awareness individual in the employer’s emergency response plan including site security and control and the [ERG].
- (F) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.”

Minimum Hours: None

First Receiver Operations.

29 CFR 1910.120(q)(6)(ii), Title 8 CCR 5192(q)(6)(B)

FRO: “(ii) First Receiver Operations level... individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First receivers at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:”

Competencies:

- “(A) Knowledge of the basic hazard and risk assessment techniques.
- (B) Know how to select and use proper personal protective equipment provided to the first receiver operational level.
- (C) An understanding of basic hazardous materials terms.
- (D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- (E) Know how to implement basic decontamination procedures.
- (F) An understanding of the relevant standard operating procedures and termination procedures.”

Minimum Hours: FRA training plus 8 hours

1. Need for First Receiver Training

- a. Primary need: Overall safe and competent response, within the “Operations” level (S.I.N.C.I.A.P.C.P.D.D.D).
- b. To give healthcare workers the ability to:
 - 1) Recognize potential or actual Haz Mat incidents,
 - 2) Conduct basic initial identification and assessment,
 - 3) Safely isolate and deny entry,
 - 4) Initiate notifications,
 - 5) Conduct patient decontamination,
 - 6) Contribute to effective and efficient response.

Note “SAFE” Acronym Theme

Safety first, last and always.

Analyze all information per your needs

Focus on First Receiver Awareness safety and competence.

Enthusiastic involvement by all.

2. The First Receiver's Role.

- a. The first people there (i.e. First Responders/Receivers) are the first line of defense to protect life, environment & property.
- b. Primary First Receiver role is to safely and competently respond within appropriate level, resources and capabilities.
- c. First Receiver at the "Awareness" Level:
 - 1) Definition: One likely to witness/discover a Haz Mat release and can initiate notifying authorities and take no further actions. [29 CFR 1910.120(q)(6)(i) & 8 CCR 5192(q)(6)(A)]
- d. First Receiver at the "Operations" Level:
 - 1) Definition: One who responds to a Haz Mat release to protect nearby persons, environment or property (trained to act in a defensive fashion without trying to actually stop the release as could a "Technician"). [29 CFR 1910.120(q)(6)(ii) & 8 CCR 5192(q)(6)(B)]
- e. First Receivers at Both Levels have Limits:
- f. Other Responders with Proper Training: (ICs; Technicians; Specialists; "Skilled Support Personnel;" etc.)

First Receiver's key role:

Safely and competently respond within (OSHA training) level, (receiving) resources and (equipment) capabilities!

Goals of the receiver:

- Save lives and limit casualties;
- Protect the environment;
- Limit damage to property;
- Restore area to normal as soon as possible.

Participant Manual: Chapter 2

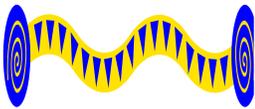
Recognition & Safety

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter explains how early recognition of a hazardous materials events and warning signs can play an important part in creating a safe and effective response to hazardous materials incidents.



Time	Instructor/Participant Ratio	Method of Instruction
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1.5 hours

1/30

Facilitated Seminar



Terminal Objective

At the end of this chapter participants will be able to describe the warning signs, placards and safety data sheets. HARM Worksheets and other clues that can help identify and develop a safety attitude in a Hazardous Materials Incident Response.



Enabling Objectives

1. Describe the Department of Transportation hazard classes
2. Describe the Hazmat Problem in the First Receiver environment
3. Explain the First Receiver's role in a hazmat incident
4. Describe the Hazmat definitions, terms and acronyms

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResB1a 3.2.3.1

Develop information regarding incident

ResB1b 1.1.1

Develop procedures to identify and assess hazards

ResB1b 6.1.1

Ensure that all responders have minimum training required to perform roles during an incident

ResB1b 1.1.1

Develop procedures to identify and assess hazards



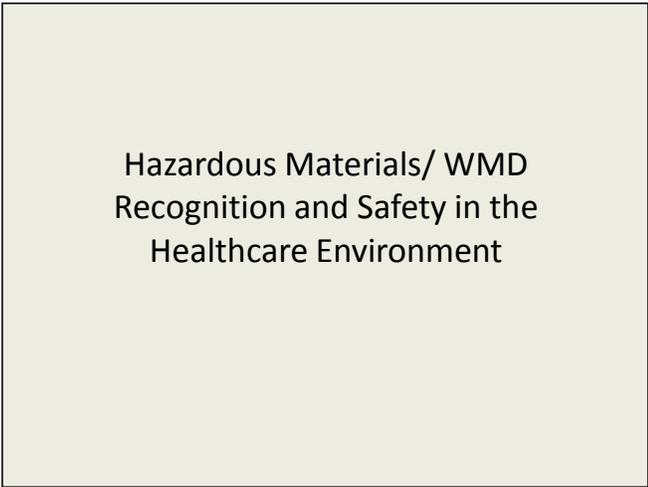
Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)



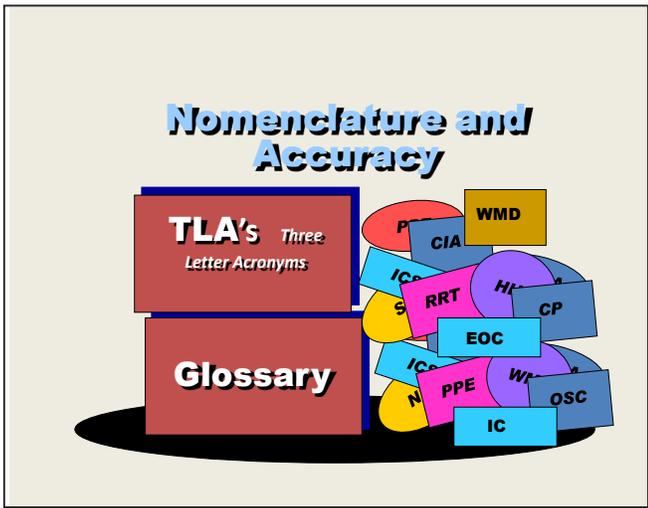
Supporting Materials

- Department of Transportation Emergency Response Guidebook
- HARM Worksheet
- Dose Makes the Poison



Slide 2.1

This section will focus on recognizing a hazardous materials incident and thinking Safety.



Slide 2.2

Need to be familiar with Haz Mat nomenclature and terminology. There is a list of acronyms and a glossary in the Supplemental Material at the end of this chapter.

It is very important to use proper terminology. Some chemicals sound alike. You may need to spell out things, don't rush through information. When looking up the hazards and risks - a small difference in the name of a chemical can make a big impact. For example the difference between

carbonic acid (soda carbonation) and carbolic acid (phenol) can cause chemical burns.

Explosives (Class 1)

<p><u>Internal</u></p> <ul style="list-style-type: none">• Powder Actuated Cartridges   	<p><u>External</u></p> <ul style="list-style-type: none">• Commercial explosives• Fireworks• Ammunition• Fertilizer bombs (Ammonium nitrate & fuel oil)• Hydrazine (A flammable liquid. Forms explosive mixtures [hypergolic] - a high energy rocket fuel, corrosive and poisonous)
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Slide 2.3

Internal - are hazards that are present in our hospitals.

External - hazards that are present in the community.

Even if your facility does not have any chemicals that are “technically” classified as EXPLOSIVE, there may be situations that cause an EXPLOSIVE atmosphere. Two chemicals may not be classified as an explosive, but the combination of the two can create an explosive atmosphere.

Compressed Gases (Class 2)

<p><u>Internal</u></p> <ul style="list-style-type: none">• Acetylene• Propane• Oxygen• Nitrogen• Nitrous Oxide• Carbon Dioxide• Anesthetic Gases• Medical Air• Argon	<p><u>External</u></p> <ul style="list-style-type: none">• Hydrogen Sulfide• Phosgene• Methyl Bromide• Ammonia     
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Slide 2.4

With compressed gases: a BLEVE (blev-ee) can occur - BLEVE (Boiling Liquid Expanding Vapor Explosion). This occurs when the container holding the gas ruptures, releasing the liquefied gas. The liquefied gas quickly expands resulting in a fireball.

Compressed gases by their nature (being under pressure) are hazardous. A rapid release can cause significant damage. Some compressed gas cylinders have up to 6000 pounds of pressure per square inch.

Flammable/Combustible Liquids (Class 3)

<u>Internal</u> <ul style="list-style-type: none">• Diesel• Alcohols• Xylene• Methyl Methacrylate• Methyl Ethyl Ketone		<u>External</u> <ul style="list-style-type: none">• Gasoline• Hydrazine• Methanol• Diesel• Acetone	
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Slide 2.5

Flammable Liquids: Have a flash point below 100 degrees F. The vapors of flammable liquids are generally heavier than air and will not dissipate rapidly. Gasoline is one of the most common products involved in HazMat incidents.

Combustible Liquids: Combustible liquids differ from flammable liquids in that they are not easily ignited at ambient temperatures.

Combustible liquids will be much easier to ignite in hot environments. (Ask class how much diesel fuel is on site. Generally there will be thousands of gallons for backup generators.) Oxygen enriched atmospheres (23.5% oxygen) will cause combustible/flammable liquids to ignite more easily and burn more intensely. Some flammables are used for their solvent characteristics rather than their ability to burn (e.g., isopropyl alcohol, xylene used in the pathology labs). Wastes with an alcohol concentration over 25% are considered ignitable wastes. These products generally have over 60% alcohol with documented burn injuries (“napalm in a bottle”) Some flammables are used for their solvent characteristics rather than their ability to burn.

Flammable Solids (Class 4)

<u>Internal</u> <ul style="list-style-type: none">• Barium		<u>External</u> <ul style="list-style-type: none">• Aluminum phosphide• Naphthalene• Sodium• Carbon• Magnesium		
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Slide 2.6

Flammable solids:

Flammable solids burn vigorously and persistently once ignited. Small fires involving combustible metals require the use of special Class D extinguishing agents. Burning metals produce hazardous gases that may be toxic, corrosive or asphyxiating.

**Oxidizers & Organic Peroxides
(Class 5)**

<p><u>Internal</u></p> <ul style="list-style-type: none">• Oxygen (actually a compressed gas or cryogenic liquid)• Peroxyacetic Acid	<p><u>External</u></p> <ul style="list-style-type: none">• Red Fuming Nitric Acid (a corrosive)• Nitrogen Tetroxide• Ammonium Nitrate• Methyl Ethyl Ketone Peroxide• Fluorine, Chlorine (also poison, compressed gas, corrosive)
---	--






Slide 2.7

Oxidizers:

Oxidizers are materials that may cause or enhance the combustion of other products, generally by yielding oxygen or other oxidizing agents.

Organic peroxides:

Organic peroxides may be flammable and unstable and possess fuel (organic compounds), oxygen (an oxidizer component) and heat (through unstable bonds). Their explosive and unstable nature is often

a more serious hazard than their characteristics as oxidizers.

**Poisonous & Infectious Materials
(Class 6)**

<p><u>Internal</u></p> <ul style="list-style-type: none">• Phenol (Carbolic Acid)• Chemotherapy drugs• Biohazardous Waste• Blood Borne Pathogens• Solvents• Sewage• Vesicants (blistering agent, Doxorubicine, Vincristine)• Mercury• ETO (ethylene oxide)• Glutaraldehyde & Formaldehyde	<p><u>External</u></p> <ul style="list-style-type: none">• Pesticides• WMD (Sarin, VX)• Solvents• Bioterrorism• Tear Gas• Vesicants (mustard, Lewisite)
--	--






Slide 2.8

Poisons and Infectious materials:

Avoid contact with any poisonous or infectious substance. Sometimes it is best to allow fires involving these materials to burn. Fire can destroy the toxic properties of some poisons.

Pesticide container labels must include additional signal words: DANGER (highly toxic), WARNING (moderately toxic), or CAUTION (relatively low toxicity).

Note that this broad category contains many of the weapons of mass destruction (addressed later in this module) and the infectious materials and blood borne pathogens of concern in a healthcare setting. The characteristics of pesticides and some of the nerve agents are similar (several nerve agents are very potent organophosphates). The treatment of these are also similar (atropine, diazepam, 2-PAM). This is part of the demystification of terrorism highlighted in this course. What are some of these WMD agents but “pesticides where you are the pest.”

Also note that some of the products used in chemotherapy are vesicants as are mustard sulphur and Lewisite.

Radioactive Materials (Class 7)

<u>Internal</u>	<u>External</u>
<ul style="list-style-type: none">Nuclear Medicine	<ul style="list-style-type: none">Terrorist useMilitary FacilitiesNuclear ReactorsCommercial/Research facilitiesIndustrial x-ray material



Slide 2.9

Radioactive materials:

Radiation can only be detected with special instruments. That is both good and bad. It cannot be seen or smelled. Protect yourself as much as possible using time, distance and shielding.

Radiation exposures should be maintained as low as is reasonably achievable.

Ensure that radiological monitoring devices are available 24/7 and not just when nuclear medicine is open.

Corrosive Materials (Class 8)

<u>Internal</u>	<u>External</u>
<ul style="list-style-type: none">Lab acids (e.g., Hydrochloric Acid)Boiler treatment causticsFloor stripper	<ul style="list-style-type: none">Pool chemicalsSulfuric acidNitric acidMuriatic acidSodium HydroxideChlorine, Fluorine



Slide 2.10

Corrosives:

The strength of a corrosive is measured by pH. The pH scale goes from 0 to 14, with 7 being neutral. 0-6 on the pH scale are acidic (acids). 8-14 are alkaline (bases).

Corrosives are also measured in terms of their concentration, which refers to the percentage of acid or base in water.

Strong Acids and Bases are not compatible with each other and may react violently.

Miscellaneous. Hazardous Materials (Class 9)

<u>Internal</u>	<u>External</u>
<ul style="list-style-type: none">Hazardous wasteAsbestosAnesthetics	<ul style="list-style-type: none">Pepper spray/maceMolten Sulphur



Slide 2.11

If it doesn't fit somewhere else, it goes into the miscellaneous category.

Definition of Spill Types

Incidental Spill
Spill that can be cleaned up in first 10-15 minutes without risk of overexposure (above Cal/OSHA short-term or Ceiling Limits) to employees under normal conditions. (May be FRA.)



Emergency Response Spill
Requires Haz Mat Response if risk of overexposure to employees. (Tech)



Slide 2.12

When is a spill a problem?

Discussion of “Incidental release” versus “Emergency” from definition section of :

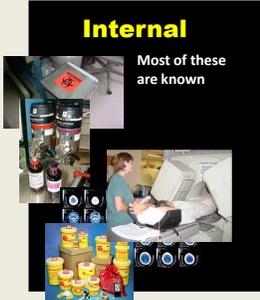
HAZWOPER 1910.120(a)(3)

“Emergency response or responding to emergencies means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or

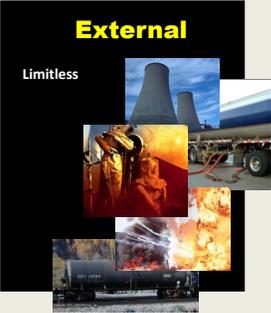
is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.” Individuals that work in or near chemicals should be trained to the Awareness level, at a minimum.

Unknown Chemicals

Internal
Most of these are known



External
Limitless



Slide 2.13

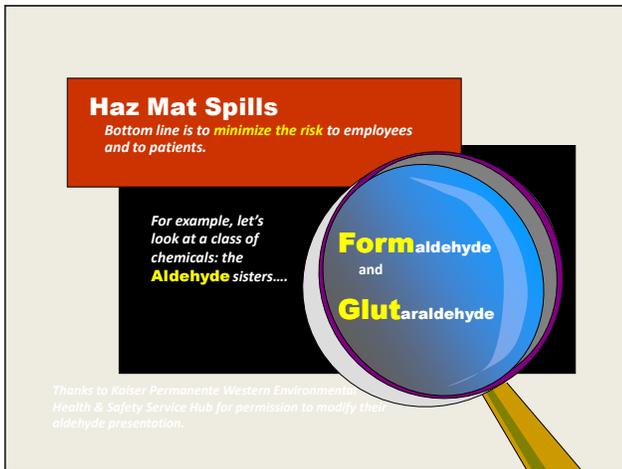
We want to spend a few minutes talking about Internal Spills.



Slide 2.14

What are the most common types of spills in your hospital?

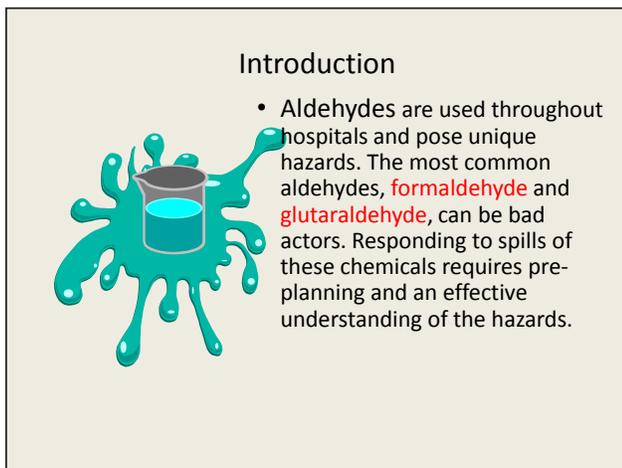
Common—Xylene, Formalin,



Slide 2.15

There are a number of toxic chemicals used inside the hospital environment

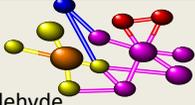
We will briefly discuss the Aldehyde's



Slide 2.16

We want to spend a few minutes talking about Internal Spills. Aldehydes are a big risk in hospitals.

HCHO



- Formaldehyde -
 - Aliphatic (straight-chain) monoaldehyde
 - Vapor density of 1.01 (similar to air)
 - Moderate vapor pressure
 - Exhibits a pungent odor at a threshold of between 0.05 - 1.0 ppm.
- Full-Strength formalin:
37% HCHO, 10-15% methanol, 48-53% water
- 10% formalin:
4% HCHO + methanol + buffer

Slide 2.17

Obviously the stronger the concentration, the more harm it may cause. “ppm”= parts per million
This is a good place to begin to associate the concept of “the dose makes the poison.”

Also, different people react differently to different concentrations. Healthcare has within its walls society’s most vulnerable members (young, old, frail, ill, compromised) and these patients may have a significant response at low concentrations.

Formaldehyde Potential Adverse Health Effects



Dermal: Skin Irritant (dermatitis, cracking, scaling) & Sensitizer.



Inhalation: Direct irritant at 1.0 ppm. Sneezing, coughing, sore throat. Chronic exposures may cause asthma and increase risk of pneumonia and bronchitis. Can cause olfactory fatigue.



Eye Contact: Transient discomfort to severe, corneal clouding/loss of vision.



Ingestion: Burning of mouth, pharynx, stomach. 37% causes severe irritation, inflammation, and even death.

Slide 2.18

Here are some of the health effects from encountering a formaldehyde spill.

Healthcare Uses of Formaldehyde

- Tissue Fixation and Preservation
- Dialysis equipment disinfection
- Stool specimen preservation
- Reticulum staining
- Biological Safety Cabinet decontamination
- Pharmacy compounding



Formaldehyde Use Areas

- Pathology / Morgue
- Operating Room
- Labor and Delivery
- Hemodialysis
- Emergency Room
- Waste Storage
- Shipping & Receiving

Slide 2.19

Formaldehyde and products made from it are common in the hospital setting. Here are some of the areas where you might encounter this product in one or more formulations.

Formaldehyde Potential Adverse Health Effects

-  • Dermal: Skin Irritant (dermatitis, cracking, scaling) & Sensitizer.
-  • Inhalation: Direct irritant at 1.0 ppm. Sneezing, coughing, sore throat. Chronic exposures may cause asthma and increase risk of pneumonia and bronchitis. Can cause olfactory fatigue.
-  • Eye Contact: Transient discomfort to severe, corneal clouding/loss of vision.
-  • Ingestion: Burning of mouth, pharynx, stomach. 37% causes severe irritation, inflammation, and even death.

Slide 2.20

There are multiple ways for hazardous materials to enter or harm the body.

Healthcare Glutaraldehyde Uses

- Cold sterilizing and disinfecting solution
- As a component of X-ray film processing chemicals
- Histology & Pathology Fixative ingredient



- Gastroenterology (GI)
- Operating Room or Ambulatory Surgery
- Respiratory Therapy
- Urology
- Sterile Processing
- Obstetrics/Gynecology
- Ultrasound/Radiology
- Histology/Pathology

Glutaraldehyde Use Areas

Slide 2.21

Glutaraldehyde is used primarily for endoscopes & other delicate instruments that may be damaged by steam, heat or hypochlorite solutions.

Glutaraldehyde Health Effects -

-  • Eyes: Clear dose-response relationship for conjunctival and corneal injury. Lowest concentration producing minor corneal injury is 1%; 0.2% for conjunctival irritation.
-  • Skin: Function of site on body, time of contact, concentration, and condition of skin. Threshold concentrations for primary dermal irritation under occlusive conditions on sensitive skin is about 0.4% solution. However, concentrations of up to 5% may not induce an irritant effect when applied briefly to bare skin.
-  • Respiratory: The threshold for peripheral sensory irritation of the respiratory tract is 0.3 ppm. Short-term repeated exposure to Glutaraldehyde vapors in concentrations from 0.2 to 3.0 ppm shows a steep dose-response for toxicity and moderately severe irritation effects.

Slide 2.22

This is a toxic chemical and precautions should be taken when this product is spilled in the facility. Do you have spill kits? Have you been trained to use them?

Summary of Health Hazards

- In spill situations, both formaldehyde and glutaraldehyde have the potential to pose a significant threat to the respiratory system, skin or eyes.
- Proper selection of respiratory protection and protective clothing is key to mitigating risk to personnel during spill clean up. (Covered in FRO.)

Slide 2.23

In other words, these spills need to be taken care of with caution, and the proper training and personal protection.

Spill Clean-up Options

- Let it evaporate if operational downtime not a problem and no recirculating exhaust to adjoining departments. (FRA)
- Departmental staff to apply spill control product and work fast to minimize exposure. (FRA?)
- Internal or external spill clean-up team (will be haz mat after first 10-15 minutes if no spill control product applied). (Tech)
- Implement permanent engineering controls that will reduce exposure risk - could be floor exhaust, increased over-all exhaust, emergency exhaust fan.

Slide 2.24 - 2.25

These factors can affect our response:

Time - If it has just occurred, maybe the liquid has emitted many vapors (avoid the use of the word "fume") yet > you may be able to intervene before the breathable concentration of the vapors reaches a dangerous level. Or if it has been awhile, maybe the vapors have dissipated some.

Volume - there is more danger from something being spread out over a large surface as opposed to something in a container, even if it is the same volume.

Spill Response Options

Neutralization/Absorption Products

- Neutralizers react with the aldehyde and convert it to a non-hazardous product.
- Inert Absorbents capture the aldehyde but it still possesses its hazardous qualities.

Concentration - affects the hazard (e.g., 4% formaldehyde in formalin vs. 37% formaldehyde that may be found in pharmacy compounding).

Ventilation - Is the area ventilated, so some of the vapors may be gone. Or are the vapors trapped in an area. Another aspect is where is the ventilation going to, is it spreading vapors though out the

facility through the air handling units or is it going outside.

Spill Control products (Neutralizers)- do you have any?

Personnel location - or patient location. Is the spill in an isolated area? Or is it next to a bunch of offices, or next to patients.

Multiple Hazards & Health Effects

- Regulations are performance standards
- More than one hazard class
- Markings don't show all hazards
- Think of multiple hazards always!

Slide 2.26

Chemicals may have more than one hazard class and multiple health effects. Markings don't always show all the hazards.

External Events

Most external events, both small and large, are accidents ... but some are not.

Lets talk about...

TERRORISM



Slide 2.27

External events may be accidental or intentional.

Types of Weapons of Mass Destruction (WMD)

- C - Chemical
- B - Biological
- R - Radiological
- N - Nuclear
- E - Explosive

Slide 2.28

These are the same types of chemicals we may encounter in accidental or intentional spills.

Introduction to Haz Mat & WMD

- Types of Weapons of Mass Destruction (cont'd.)
- Others
- Incendiary (arsonist)
- Explosive (bomber)
- Firearm (assassin)

- Common Hazards
- Typical Hazardous Materials - You May Encounter
- Potential Weapons of Mass Destruction - You Will be Directed To

Slide 2.29

Other typicals

Chemical Terrorism

Is a Haz Mat Event

Types of Agents

- Nerve - *Sarin* *VX*
- Blister (vesicants) - *Mustard* *Lewisite*
- Blood - *Cyanide*
- Choking - *Chlorine* *Phosgene*
- Irritating - *Tear Gas* *Pepper Spray*

Slide 2.30

Here are some common types of chemical agents considered candidates for use by terrorists. Many of these types of chemicals are found in industry as well

Biologic Terrorism

Is an Infectious Disease Event

Types of Agents

- Bacteria
Anthrax *Plague* *Tularemia*
- Viruses
Smallpox *Hemorrhagic Fevers (Ebola)*
Venezuelan equine encephalitis (VEE)
- Toxins
Botulism *Ricin*

Slide 2.31

These are the most likely bacterial agents that might be used by a terrorist. Some of these can exist in the hospital environment through infected patients.

Scene Clues

- People running from area
- People collapsed in the area
- Evidence of a leak
- Fire
- Vapors
- Unusual colors/ odors
- Loud roar or increased pitch of a valve

Slide 2.32

Recognition clues from the scene.

Note: “One person convulsing on the ground might be epilepsy. Two people convulsing on the ground is not epilepsy.”

Information Resources

- Container Labels
- SDS's
- Poison Control
- ERG
- ATSDR
– Agency for Toxic Substance & Disease Registry
- Computer programs
- People



Slide 2.33

When you know the name of the chemical involved, how can you find out more information about it?

How dangerous is it?

What kind of protection do you need?

Container Label may give you some information.

Safety Data Sheets will give you good starting info.

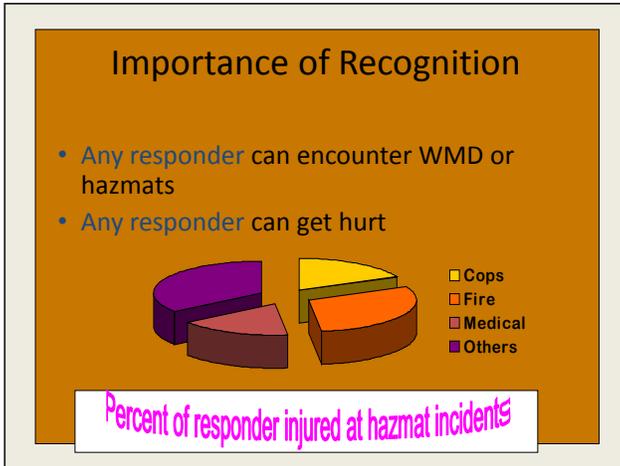
Poison Control - great resource. Can also give you treatment information. Can Fax you info.

ERG (Emergency Response Guidebook, Orange book)

ATSDR (Agency for Toxic Substance & Disease Registry) - Good resource. Can now download Medical Management Guidelines off the web.

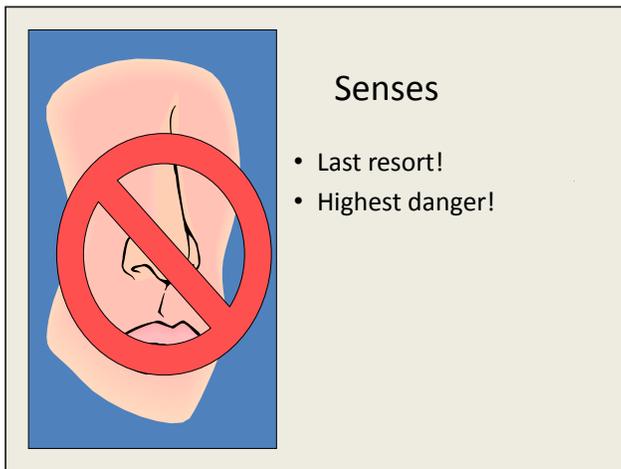
Other computer programs that provide information are available, such as CAMEO.

Should use a minimum of 3 sources of information. One source may not tell you every thing about the substance.



Slide 2.34

Notice that medical personnel make up a large percentage of people injured in a hazardous materials incident.



Slide 2.35

Be careful about using your senses to determine anything about a chemical spill. Many are odorless and colorless. Often toxic chemicals can knock out our ability to smell them in a very short time.

“No Nasal Appraisal”

“Clues” are “Clues”!

- They are a,
 - Warning
 - Note of caution
 - Indication of things to come

Slide 2.36

Don't get blinders on just because you believe a clue and come to final conclusions based on them. There may be other things you need to consider. Keep your eyes and mind open.

Hospital Triage Clues



- Liquids or powders on the patient
- Odors
- What were they doing when this happened?
- Where were they?
- How long ago did the accident occur?

Need to recognize and act fast

Slide 2.37

Clues and questions the Triage Nurse should be asking.

Especially if the patient has something on them - powder, clothes wet and it is not raining outside.

Always be cautious! Initial reports may not indicate the presence of hazardous materials.

Safety Data Sheets



- Should be available for each Hazmat in the workplace
 - Required by OSHA Hazard Communication Regs
- Provides valuable information

Slide 2.38

SDS's give you the following information:

Chemical Name

Chemical/physical properties, etc.

Hazard identification

Often SDS are incomplete, inaccurate, misleading, difficult to read. Use multiple sources.

A more complete listing of

Know Your...



- Level of Training
- Role
- Responsibility
- Limits

Slide 2.39

It is important the you remain aware of your level of training, role in your facility, and what your limits are based on training, manpower, and resources. In the next section will be talking about the role of the receiver at the awareness level.

Supplemental Material

Introduction/Haz Mat Recognition and Safety

Main Points

- The Haz Mat Problem
- DOT Haz Mat Classes and Examples.
- Multiple Hazards and Health Effects of Each Class
- Haz Mat “Commons” and “Typicals”
- The First Receiver’s Role
- Haz Mat Tactical Operations/Priorities Acronym
- Pertinent Authorities and Regulations
- Haz Mat Definitions, Terms and Acronyms
- Importance of Recognizing Haz Mat Incidents
- Haz Mat Events Not Reported as Haz Mat Incidents
- Haz Mat Recognition Clues
- Haz Mat Outward Warning Signs
- Special Markings
- D.O.T. Haz Mat Placards and Labels
- Shipping Papers and SDSs
- First Operational Thought is Safety
- Death & Injury Due to Lack of Safety

1. The Haz Mat Problem.
 - a. Common use and misuse of Haz Mats create “Events.”
 - 1) Standard of living requires Haz Mat use and transport.
 - 2) Over 16 million chemicals in existence, up to 70,000 potentially classified as “hazardous.”
 - b. Two major elements of the Haz Mat problem include:
 - 1) Volume of hazardous materials, and
 - 2) The human factor.
 - c. Because of these elements, “Events” (accidents, emergencies and incidents) will happen.
 - d. Haz Mat “Events” can pose at least 3 primary risks (fire, health and reactivity risks) and can have 3 negative outcomes on Life/Health, Environment, and Property — In that order!
 - e. Government or industry cannot eliminate events, but can:
 - 1) Mitigate events,
 - 2) Prepare for events,
 - 3) More effectively and efficiently respond to events.
 - f. Haz Mat events are different from other emergencies:
 - 1) Must respond or receive patients safely, slowly and methodically.

Hazardous Materials Events

	People
	+ Hazardous Materials
Haz Mat Events!	

Fundamental difference in a Haz Mat response:

We must receive:

- Safely
- Slowly
- Methodically



Haz Mat events cannot be eliminated—interaction of Haz Mats and human beings will create Haz Mat events!

What are hazardous materials?

Definitions: There is no one definition! Here are a few...

OSHA: Hazardous Chemical: Any substance to which exposure “results or may result in adverse effects on the health or safety of employees”: or “any chemical which is a physical hazard or a health hazard.” 29 CFR 1910.1200(c)

EPA: Hazardous Substance: “Any substance designated pursuant to Section 311(b)(2)(A) of the CWA [Clean Water Act]; any element, compound, mixture, solution or substance designated pursuant to Section 102 of CERCLA; any hazardous waste having the characteristics identified under or listed pursuant to Section 301 of the Solid Waste Disposal Act... any toxic pollutant listed under Section 307(a) of the CWA; any hazardous air pollutant listed under Section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to Section 7 of the Toxic Substances Control Act.” 40 CFR 300.5

DOT: Hazardous Material: “...substance or material, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce... The term includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials as defined in this section...” 49 CFR 171.8

2. Multiple Hazards and Health Effects of Each Class.

- a. DOT regulations are performance standards—it's possible for a substance to meet the definition of more than one hazard class.
- b. Substances that meet the definition of more than one hazard class are classified according to the highest applicable hazard class (49 CFR 173.2a) and are placarded accordingly.
- c. Shipping papers and placards may not indicate all subsidiary or multiple hazards.
- d. Receivers should always think of multiple hazards regardless of how a substance is placarded or labeled!

3. Haz Mat “Commons” and “Typicals.”

- a. Commons:
 - 1) Common release: Petroleum products (diesel or gasoline).
 - 2) Common release locations: Fixed facilities (in over 25% of the incidents, the surrounding area was residential).
 - 3) Common release factor: Abandonment/intentional act.
- b. Typical:
 - 1) Typical receiver exposure: Inhalation;
 - 2) Typical number of response agencies: Four;
 - 3) Typical receiver problem: Poor response management!

Multiple Hazards

49 CFR 171.8 A material may meet the defining criteria for more than one hazard class but is assigned to only one hazard class.

49 CFR 172.505 Hazardous materials that possess secondary hazards may exhibit subsidiary placards.

Examples

Material	Primary Hazard	Subsidiary Hazard(s)
Acrolein	Poisonous	Flammable
Ammonia, anhydrous	Poisonous	Corrosive
Chlorine	Poisonous	Corrosive
Denatured Alcohol	Flammable	Poisonous
Hydrazine, anhydrous	Corrosive	Flammable, Poisonous
Hydrofluoric Acid	Corrosive	Poisonous
Methanol	Flammable	Poisonous
Nitric Acid, red fuming	Corrosive	Oxidizer, Poisonous
Phosphorus, white	Spontaneously Combustible	Poisonous
Sulfur Dioxide	Poisonous	Corrosive
Uranium Hexafluoride	Radioactive	Corrosive

Commons and Typicals

The most commonly released hazardous substance in my location is:	
The most commonly shipped or manufactured substance in my location is:	
The most common release location where I live/work is:	

Be part of the solution, not the problem,

and know your limits!!



5. Haz Mat Tactical Operations Acronym.

- a. S.I.N.C.I.A.P.C.P.D.D.D. - See attachment, then develop your own acronym/checklist/memory jogger!

6. Pertinent Authorities and Regulations.

- a. 29 CFR 1910.120(q) and Title 8 CCR 5192(q): Safety, Planning, Response and Training.
- b. CVC 2454: IC for incidents on highway/road.
- c. CVC 2453, CH and SC 6.95, SARA Title III 304: Notifications.

Haz Mat Tactical Operations/Priorities Acronym

S *Safety*
I *Isolation & Deny Entry*
N *Notifications*

C *Command/Management*
I *Identification & Hazard Assessment*
A *Action Planning*

P *Protective Equipment*
C *Containment & Control*
P *Protective Actions*

D *Decontamination & Cleanup*
D *Disposal*
D *Documentation*

7. Haz Mat Definitions, Terms and Acronyms.

- a. Hazardous Materials — No one definition (Substance outside normal safe containment in sufficient concentration to pose serious immediate threat to life, environment and property?).
- b. IDHA — Identification and Hazard Assessment.
- c. IC — Incident Commander.
- d. Know basic Haz Mat terms and acronyms (See Annex).

DOT Classifications of Hazardous Materials.

Class #	Division #	Name of Class or Division	49 CFR §
1	1.1	Explosives (with mass explosion hazard)	173.50
1	1.2	Explosives (with projection hazard)	173.50
1	1.3	Explosives (with predominately a fire hazard)	173.50
1	1.4	Explosives (with no significant blast hazard)	173.50
1	1.5	Very insensitive explosives; blasting agents	173.50
1	1.6	Extremely insensitive detonating substances	173.50
2	2.1	Flammable gas	173.115
2	2.2	Nonflammable compressed gas	173.115
2	2.3	Poisonous gas	173.115
3		Flammable and combustible liquid	173.120
4	4.1	Flammable solid	173.124
4	4.2	Spontaneously combustible material	173.124
4	4.3	Dangerous when wet material	173.124
5	5.1	Oxidizer	173.128
5	5.2	Organic peroxide	173.128
6	6.1	Poisonous materials	173.132
6	6.2	Infectious substance (Etiologic agent)	173.134
7		Radioactive material	173.403
8		Corrosive material	173.136
9		Miscellaneous hazardous material	173.140
None		Other regulated material: ORM-D	173.144

Definitions of DOT Hazard Classes.

Class 1	Any substance, article or device designed to function by explosion (extremely rapid release of gas and heat).
Class 2	Flammable gas: Ignitable at low concentrations (<13%). Compressed gas: Shipped at >41 psia. Poisonous gas: Toxic to humans or hazardous to health (or LC50 of not more than 5000 ml/m ³ for laboratory animals). (i.e. Toxic in low concentrations.)
Class 3	Flammable Liquid: Flash point <141°F. Combustible Liquid: Flash point >141°F. (100°-200°F for domestic shipments.)
Class 4	Explosives shipped with sufficient wetting agent to suppress explosive properties. Substance that can ignite if in contact with air <5 minutes. Substance that gives off flammable or toxic vapors or is spontaneously flammable upon contact with water.
Class 5	A material that can cause or enhance the combustion of other materials (usually by giving up oxygen.)
Class 6	Toxic to humans, hazardous to human health or presumed toxic to humans based upon tests on laboratory animals.
Class 7	Substance with specific activity > 0.002 microcuries per gram.
Class 8	Substance that causes visible destruction or irreversible alterations in human skin tissue or a liquid that has a severe corrosion rate on steel or aluminum.
Class 9	Material with anesthetic, noxious or similar property that could cause extreme annoyance or discomfort to flight crew and prevent performance of assigned duties. Does not meet the definition of any other class.

Block Outline

1. Importance of Recognizing Haz Mat Incidents.
 - a. Any receiver can encounter hazardous materials. According to an ongoing federal government study (ATSDR 1997), of the injuries to responders/receivers in Haz Mat incidents:
 - 1) 18% are law enforcement personnel
 - 2) 30% are firefighters (career and volunteer)
 - 3) 17% are medical personnel (EMS and hospital)
 - 4) 35% are other responders (includes in-house response teams)
 - b. If you don't know it's there, you can't protect yourself.
 - 1) Recognition leads to safety,
 - 2) Safety leads to lives preserved!
2. Many Haz Mat Incidents Not Always Clearly Reported as Haz Mat Incidents.
 - a. Traffic accident,
 - b. Medical aid,
 - c. Fire,

Person down.

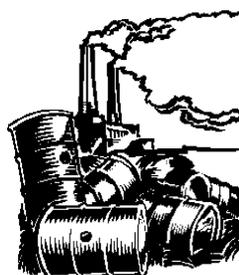
Sick walk-in patient
 - f. Or, _____
 - g. Initial report may not indicate presence of hazardous materials!

3. Haz Mat Recognition Clues.

- a. Occupancy/Location (e.g. plating shop or highway).
 - 1) Haz Mats manufactured/stored/used/transported anywhere but be aware of common locations.
- b. Container Shapes (e.g. 55-gallon drum or ribbed tanker).
 - 1) Shape may be clue to its contents (they are shaped the way they are for a reason—know common silhouettes).
 - a) DOT specifications.
 - b) Compressed gas containers.
 - c) Common above-ground storage tanks.
 - 2) Potential stresses on Haz Mat containers: thermal, mechanical, chemical and radiation.
- c. Markings & Colors (e.g. package/label markings or colors).
- d. Placards & Labels (e.g. orange placard = Explosive).
- e. Shipping Papers and SDSs (e.g. consist for railroad incident).
- f. Senses (e.g. sight, hearing and smell - last resort).
- g. Other Clues (e.g. responsible party, witness, business plan, etc.).
- h. “Clues” are clues, not absolutes! They are...
 - 1) A warning,
 - 2) A note of caution,
 - 3) An indication of things to come,
 - 4) But not always all the answers you need.

Recognition—Standard Haz Mat Recognition Clues:

Occupancy/Location



Container Shapes



Markings & Colors



Placards & Labels



Shopping Papers & SDS



Senses



4. Haz Mat Outward Warning Signs.

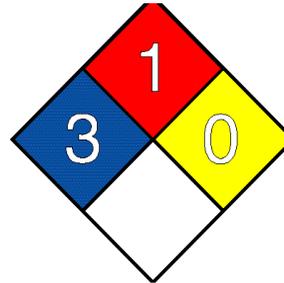
- a. Many signs
 - 1) People running from, or collapsed in the area,
 - 2) Evidence of leak (fire, smoke, vapors, unusual colors/odors),
 - 3) Loud roar or increased pitch of an operating relief valve, etc.
- b. Remember: Assume Haz Mat and look for clues or warning signs until you confirm the absence of hazardous materials!

5. Special Markings.

- a. NFPA 704,
- b. Biohazard markings,
- c. Military markings,
- d. Pipeline markers,
- e. Hazard communication markings (e.g. HMIS®),
- f. Railcars,
- g. Others.

Special Markings.

NFPA 704



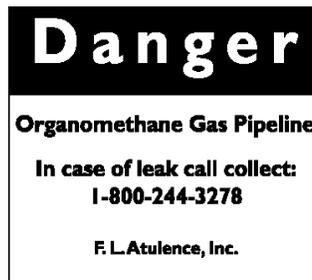
Biohazard Markings



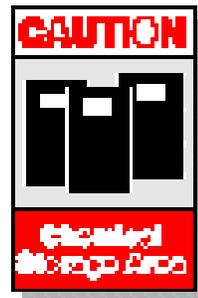
Military Markings



Pipeline Markers



Hazcom Markers



6. D.O.T. Haz Mat Placards and Labels.

- a. Know Haz Mat classes (with colors/symbols) and examples:
- 1) Explosives (Orange/Bursting Ball) — Trinitrotoluene.
 - 2) Gases (Green/Cylinder) — Ammonia.
 - 3) Flammable Liquids (Red/Flame) — Gasoline.
 - 4) Flammable Solids (Red & White Stripes/Flame) — Fusee.
 - 5) Oxidizers (Yellow/Flaming “O”) — Hydrogen Peroxide.
 - 6) Poisons (White/Skull & Crossbones) — Methyl Parathion.
 - 7) Radioactives (Yellow over White/Trefoil) — Thorium.
 - 8) Corrosives (White over Black/Test Tube) — Sulfuric Acid.
 - 9) Misc. Hazardous Materials (White w/Black Vertical Stripes).
- b. Know placard limits.
- 1) Multiple and subsidiary hazards.
 - 2) “Dangerous” placard meaning (Table 1 & 2 commodities).
 - 3) Compliance and enforcement.

Safety Data Sheet (SDS)

General Info: The Occupational Safety and Health Act, Hazard Communication Standard, and the regulations issued under that Act, require employers that use or produce hazardous substances to prepare written documentation describing the hazards the substance may present. OSHA regulations require 10 types of information. The American National Standard Institute (ANSI) has developed a standard (ANSI Z400.1) for SDSs that expands on the OSHA requirements and requires an SDS to have the following sections:

- Requirements:*
- Chemical product and company identification. (OSHA reg)
 - Composition/information on ingredients. (OSHA reg)
 - Hazard identification (including an emergency overview subsection to describe the material's appearance and the most significant concerns). (OSHA reg)
 - First aid measures. (OSHA reg)
 - Firefighting measures. (OSHA reg)
 - Accidental release measures. (OSHA reg)
 - Handling and storage. (OSHA reg)
 - Exposure controls/personal protection. (OSHA reg)
 - Physical and chemical properties. (OSHA reg)
 - Stability and reactivity. (OSHA reg)
 - Toxicological information (including background toxicological information).
 - Ecological information (including information on the material's effect on plants, animals and the environment).
 - Disposal considerations.
 - Transport information (including basic shipping classification information).
 - Regulatory information (with additional regulatory information affecting the material).
 - Other information.

Bloodborne Pathogens — Warnings. (CCR 5193)

Labels: Warning labels required on:

Containers of regulated waste.

Refrigerators and freezers containing blood or other potentially infectious material.

Other containers used to store, transport or ship blood or other potentially infectious materials.

May substitute red bag or red container for label under certain conditions. (Regulated waste must also have a label.)

Signs: Work areas containing infectious materials must have a biohazard sign posted on every entrance. Must also have the name of the infectious agent, information on special requirements for entering the area and the name and phone number of the responsible person.

Symbol:



Lettering: The symbol must have the words “BIOHAZARD” or “BIOHAZARDOUS WASTE” under the symbol.

Haz Mat Recognition – Case Histories

An emergency medical perspective...

“Our engine company (3 man fire engine) arrived on scene at the local high school for an apparent poisoning.

The male student ingested Lannate pesticide (quarter pound mixed in water). The student was unconscious with vital signs dropping rapidly. The powder was airborne and floating freely with movement of the patient and wind. The captain started to cough and nearly vomited.

I was a firefighter at the time... and rode into the hospital with the private ambulance (paramedic trained). Epi cardio converted the patient and all were excited about a great save.

However, lessons learned:

Safety - recognize danger of spread of pesticide (it's designed to kill).
Isolate and deny entry - keep students away, call for police to secure area.

Notifications - notify ambulance of impending danger; environmental health, allied agencies...

We now have a full Haz Mat Team in place as well as shift Haz Mat Team members on duty; first responder operations Haz Mat training for all firefighters...”

Scott Coffman
Fire Captain

Haz Mat Recognition – Case Histories (cont.)

A hospital and emergency medical perspective...

“I treated a 28 year old for trouble breathing after she was trying to clean her house. She was using a “flea” powder to help control fleas in her home from the family dog. Most often these powders are placed on the carpet and swept up, however, she decided to place it on the wood floor as well and use a broom to agitate it causing a “dust” in the air which she inhaled.

This was her first experience with this powder and we approached it as a possible allergic reaction. Consultation with Poison Control did not lead us to a pesticide poisoning since her symptomology was not consistent with organophosphate OD.

We were also at a disadvantage because she was intercepted on the way to the hospital so we did not have access to the actual product.

In the [hospital] emergency department, she started getting worse and other patients and nurses began complaining of various things, mostly nausea.

I talked to poison control again who explored the issue some more and determined that it might be a pesticide (industrial) and she should be deconned. She was taken into the Haz Mat area where her clothes were removed and red-bagged, [she was] showered and put into a gown. All the affected ED personnel were required to go to the locker room, shower and change clothes.

The patient’s condition cleared in about 20 minutes.

As it turned out, her husband got an industrial strength pesticide which is used on a house (you know when they put that big tarp over your house for a few days).”

Robert M. Sklar, NREMT-P
University of Maryland
Department of Emergency Health Services
Howard County, Fire and Rescue

Haz Mat Recognition – Case Histories (cont.)

A “multi-disciplinary” perspective...

In August 1996, Los Angeles County Sheriff’s deputies and paramedics entered a motel room in Carson, CA in response to a report of an unknown number of persons suffering from a possible drug overdose. They found three bodies in the room, one on a bed, one on the floor behind the door and one in the bathroom lying on the floor. None of the bodies showed any signs of injury.

The deputies found a collection of typical drug lab chemicals and apparatus, including a 2 liter flask in the bathroom. They also noticed a “heavy chemical odor.” Although the air conditioner was on and the bathroom window was slightly open, there were bed sheets surrounding the edge of the door as if the occupants had attempted to keep any vapors or gases from escaping. The responders exited the location and notified the Bureau of Narcotics Enforcement (BNE) Clandestine Laboratory Task Force. Members of that Task Force and the Los Angeles County Health Hazardous Materials unit assessed the scene and detected the presence of phosphine gas. The coroner later found that the three victims died of pulmonary edema caused by inhalation of phosphine gas.

Phosphine is a colorless gas that may have a fishy or garlic-like odor. It has been widely used as a grain fumigant and is also used in the manufacture of semiconductors. Certain processes used in clandestine drug labs can generate phosphine gas. It can be toxic at levels as low as 400 parts-per-million.

Participant Worksheet

1. In your own words, describe the fundamental difference in receiving patients in a Haz Mat incident vs. a “Normal” day-to-day emergency response:

2. Identify your jurisdiction’s primary Haz Mat problem, including three potential negative outcomes of the problem:

3. Describe the difference in roles between First Receivers at the “Awareness” and “Operations” levels:

4. Identify the First Receiver’s Primary Role (regardless of level), and cite at least three tactical operations common to Haz Mat incidents:

HAZ MAT FOR HEALTHCARE

GLOSSARY

The express purpose of this glossary of standardized terms is to provide common and readily understandable definitions for both hazardous materials emergency response and terrorism in order to facilitate communications and operations among emergency responders when dealing with hazardous materials incidents. This document is not intended to be a legal or scientific reference. Modified from California Hazardous Materials Incident Contingency Plan.

Abatement	The actions taken to reduce the amount, degree of the hazard, or intensity of the release or threatened release of a hazardous material.
Absorption	1) The process of absorbing or “picking up” a liquid hazardous material to prevent enlargement of the contaminated area; 2) Movement of a toxicant into the circulatory system by oral, dermal, or inhalation exposure.
Acceptable Risk	A risk judged to be outweighed by corresponding benefits or one that is of such a degree that it is considered to pose minimal potential for adverse effects.
Access Control Point	The point of entry and exit which regulates traffic to and from control zones. Adjuvant A substance used in pesticide formulation to aid its action. (Also used in the manufacture of drugs.)
Adsorption	Process of adhering to a surface.
Aerosols	Liquid droplets, or solid particles dispersed in air, that are of fine enough particle size (0.01 to 100 microns) to remain dispersed for a period of time.
Airborne Pollutants	Contaminants that are carried/released into the atmosphere or air.
Air Purifying Respirators (APR)	Personal Protective Equipment; a breathing mask with specific chemical cartridges designed to either filter particulates or absorb contaminants before they enter the worker’s breathing zone. They are intended to be used only in atmospheres where the chemical hazards and concentrations are known.
Air Purifying Respirator- powered	An APR with a portable motor to force air through the filtering/purifying cartridges for use only in atmospheres where the chemical hazards and concentrations are known.
Air Quality Management District	
Area Plan	A document established to facilitate emergency response to a release or threatened release of a hazardous material within a city or county. (California Health and Safety Code, Section 25503, Chapter 6.95)
Asphyxiant	A vapor or gas that can cause unconsciousness or death by suffocation (lack of oxygen).
Base (Chemical)	A hydroxide containing (-OH) corrosive material that when in a water solution is bitter, more or less irritating, or caustic to the skin.

Base (ICS)	Location at which additional equipment, apparatus, and personnel are assembled for primary support of activities at the incident scene. The command post may be located at the "base". (NIIMS)
Biohazard	Infectious agents presenting a risk or potential risk to living organisms, either directly through infection or indirectly through disruption of the environment.
Biological Agents	Biological materials that are capable of causing acute or long term damage to living organisms. (NFPA 1990, 1-3)
Boiling Liquid Expanding Vapor Explosion (BLEVE)	A container failure with a release of energy, often rapidly and violently, which is accompanied by a release of gas to the atmosphere and propulsion of the container or container pieces due to an overpressure rupture.
Boom	A floating physical barrier serving as a continuous obstruction to the spread of a contaminant.
Bootie	A sock like over-boot protector worn to minimize contamination.
Breakthrough Time	The elapsed time between initial contact of the hazardous chemical with the outside surface of a barrier, such as protective clothing material, and the time at which the chemical can be detected at the inside surface of the material.
Buddy System	A system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. [8 CCR 5192 (a)(3)]
Buffer Zone	The area of land that surrounds a hazardous waste facility on which certain usages and activities are restricted to protect the public health and safety, and the environment from existing or potential hazards caused by the migration of hazardous waste.
California Department of Fish and Game (DFG)	The State department which enforces provisions of the State Fish and Game Code that prohibits pollution of habitats, waters and ocean waters; and acts as the State Liaison Officer at major off highway hazardous materials incidents.
California Department of Health Services (DHS)	The State department containing the Radiological Health Branch, Office of Drinking Water and Office of Risk Assessment in addition to medical and health services.
California Department of Transportation (Caltrans)	The State department responsible for planning, designing, constructing, operating, and maintaining the State's highway system. It will ensure, in cooperation with other public and private agencies, the identification and containment of hazardous materials and restoration of orderly traffic flow.

California Division of Occupational Safety and Health (Cal/OSHA)	The State division responsible for enforcement of worker safety laws.
Environmental Protection Agency (Cal/EPA)	The State agency consisting of the Departments of Toxic Substances Control and Pesticide Regulation, the Office of Environmental Health Hazard Assessment, the Department of Water Resources and Regional Water Quality Control Boards, the Air Resources Board and the Integrated Waste Management Board. Cal/EPA sets the policy and direction that the member organizations pursue.
California Hazardous Materials Incident Reporting System (CHMIRS)	A mandatory post-incident reporting system to collect statistical data on hazardous material incidents in California. This data includes a description of the disaster, the location, the time and date, the state and local agencies responding, the actions taken by the agencies, and the agency which had primary authority for responding to the disaster. (Chapter 6.95 of the Health and Safety Code, Title 19 CCR, and Government Code Section 8574.8 (d))
California Highway Patrol (CHP)	The State agency with primary responsibility for traffic supervision and control on all State highways constructed as freeways, all State-owned vehicular crossings, and on most State and county highways and roadways in unincorporated areas of the State. The department enforces hazardous materials transportation laws and acts as Incident Commander, the State Liaison Officer, and the Statewide information, assistance, and notification coordinator for all hazardous materials incidents within its jurisdiction.
California Office of Emergency Services (OES)	The State agency responsible for administration of Health and Safety Code Chapter 6.95 and Title 19 CCR, and development of Statewide disaster response plans, and coordination of Statewide mutual aid.
California Specialized Training Institute (CSTI)	The organization within the State Office of Emergency Services with the responsibility to standardize curriculum and certify instructors, students, and classes in the area of hazardous materials emergency response for the public and private sectors.
Carboy	A container, usually encased in a protective basket or crate, used to ship hazardous materials, particularly corrosives.
Carcinogen	An agent that produces or is suspected of producing cancer. (FEMA HMCP)
Cease and Desist Order	Legal direction to stop any and all activities.
Celsius (Centigrade) C	The internationally used scale for measuring temperature, in which 100o is the boiling point of water at sea level (1 atmosphere), and 0o is the freezing point.
Center for Disease Control (CDC)	The federally funded research organization tasked with disease control and research.

Chemical Protective Clothing Material	Any material or combination of materials used in an item of clothing for the purpose of isolating parts of the wearer's body from contact with a hazardous chemical. (NFPA 1991,1-3)
Chemical Protective Suit	Single or multi-piece garment constructed of chemical protective clothing materials designed and configured to protect the wearer's torso, head, arms, legs, hands, and feet. (NFPA 1991, 1-3)
Chemical Resistance	The ability to resist chemical attack. The attack is dependent on the method of test and its severity is measured by determining the changes in physical properties. Time, temperature, stress, and reagent may all be factors that affect the chemical resistance of a material.
Chemical Resistant Materials	Materials that are specifically designed to inhibit or resist the passage of chemicals into and through the material by the processes of penetration, permeation or degradation.
Chemical Transportation Emergency Center (CHEMTREC)	The Chemical Transportation Center, operated by the Chemical Manufacturers Association (CMA), can provide information and technical assistance to emergency responders. (Phone number- 1-800-424-9300)
Chronic Effect	Delayed or slowly developing harm resulting from a chemical exposure which is often hard to recognize.
Cleanup	Incident scene activities directed toward removing hazardous materials, contamination, debris, damaged containers, tools, dirt, water, and road surfaces in accordance with proper and legal standards, and returning the site to as near a normal state as existed prior to the incident. (Sacramento Fire Department HMRT)
Cleanup Company (Hazardous Waste)	A commercial business entity available for hire to specifically remove, transport, and/or dispose of hazardous wastes; and when appropriate, must meet California Highway Patrol and Department of Toxic Substances Control requirements.
Cleanup Operation	An operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment. (8 CCR 5192(a)(3))
Clean Water Act (CWA)	Federal legislation to protect the nation's water and set State water quality standards for interstate navigable waters as the basis for pollution control and enforcement. The main objective is to restore and maintain the chemical, physical and biological integrity of the Nation's waters.
Cold Zone	The area outside of the warm zone. Equipment and personnel are not expected to become contaminated in this area. This is the area where resources are assembled to support the hazardous materials operation.
Combustible Liquid	Liquids with a flashpoint above 100o F. (49 CFR 173.120 (b)(2).)

Command	The act of directing, ordering, and/or controlling resources by virtue of explicit legal, agency, or delegated authority. (NIIMS)
Command Post	The location from which the primary command functions are executed, usually co-located with the incident base.
Community Right-to-Know	Legislation requiring business establishments to provide chemical inventory information to local agencies or the public.
Compatibility	The matching of protective chemical clothing to the hazardous material involved to provide the best protection for the worker.
Compatibility Charts	Permeation and penetration data supplied by manufacturers of chemical protective clothing to indicate chemical resistance and breakthrough time of various garment materials as tested against a battery of chemicals. This test data should be in accordance with ASTM and NFPA standards.
Compressed Gas	Any material or mixture having an absolute pressure exceeding 40 p.s.i. in the container at 70o F or, regardless of the pressure at 70o F, having an absolute pressure exceeding 104 p.s.i. at 130o F; or any liquid flammable material having a vapor pressure exceeding 40 p.s.i. absolute at 100o F as determined by testing. Also includes cryogenic or “refrigerated liquids” (DOT) with boiling points lower than -130o F at 1 atmosphere.
Confinement	Procedures taken to keep a material in a defined or localized area.
Contact	Being exposed to an undesirable or unknown substance that may pose a threat to health and safety. (Sacramento Fire Department HMRT)
Container	Any device, in which a hazardous material is stored, transported, disposed of, or otherwise handled.
Containment	All activities necessary to bring the incident to a point of stabilization and to establish a degree of safety for emergency personnel greater than existed upon arrival.
Contamination	An uncontained substance or process that poses a threat to life, health, or the environment. (NFPA 472, sections 1-3)
Contamination Control Line	The established line around the contamination reduction zone that separates it from the support zone. Term used by the Coast Guard to identify the area of moderate hazard where threat of contamination spread to the immediate surrounding area is low. It is the area immediately outside of the inner hot zone. (See Warm Zone.)
Contingency Plan	A pre-planned document presenting an organized and coordinated plan of action to limit potential pollution in case of fire, explosion, or discharge of hazardous materials; defines specific responsibilities and tasks.
Control	The procedures, techniques, and methods used in the mitigation of a hazardous materials incident, including containment, extinguishment, and confinement.

Control Zones	The designation of areas at a hazardous materials incident based upon safety and the degree of hazard. (NFPA 472, sections 1-3) (See Support Zone, Warm Zone, Hot Zone, and Decontamination Corridor.)
Corrosive	The ability to cause destruction of living tissue or many solid materials surfaces by chemical action.
Cryogenic	Gases, usually liquefied, that induce freezing temperatures of -150o F and below (liquid oxygen, liquid helium, liquid natural gas, liquid hydrogen, etc.).
Damming	A procedure consisting of constructing a dike or embankment to totally immobilize a flowing waterway contaminated with a liquid or solid hazardous substance. (EPA, 600/2-77-277)
Dangerous When Wet	A label required for water reactive materials (solid) being shipped under U.S. DOT, ICAO, and IMO regulations. A labeled material that is in contact with water or moisture may produce flammable gases. In some cases, these gases are capable of spontaneous combustion. (49 CFR 171.8)
Decontamination (Decon)	The physical and/or chemical process of reducing and preventing the spread of contamination from persons and equipment used at a hazardous materials incident. (Also referred to as “contamination reduction”.) (NFPA 472, 1-3)
Decontamination Corridor	A distinct area within the warm zone that functions as a protective buffer and bridge between the hot zone and the cold zone, where decontamination stations and personnel are located to conduct decontamination procedures.
Decontamination Officer	A position within the FIRESCOPE ICS HM-120 that has responsibility for identifying the decontamination corridor location & types of decontamination, assigning stations, and managing all decontamination procedures.
Decontamination Team	A group of personnel and resources operating within a decontamination corridor.
Degradation	The loss in physical properties of an item of protective clothing due to exposure to chemicals, use, or ambient conditions.
Delayed Toxic Exposure Effect	The condition in which symptoms of an exposure are not present immediately after the exposure, but are delayed for a relatively short period of time (such as pulmonary edema a few hours after an inhalation exposure).
Department of Defense (DOD)	The Federal entity that provides the military forces needed to deter war and protect Department of Justice

Department of Justice (DOJ)	The Federal department which serves as counsel for the citizens of the Nation; represents them in enforcing the law in the public interest; through its thousands of lawyers, investigators, and agents it plays a key role in protection against criminals and subversion, in insuring healthy competition of business in our free enterprise system, in safeguarding the consumer, and in enforcing drug, immigration, and naturalization laws; plays a significant role in protecting citizens through its efforts for effective law enforcement, crime prevention, crime detection, and prosecution and rehabilitation of offenders; conducts all suits in the Supreme Court in which the United States is concerned; and represents the Federal Government in legal matters.
Department of Transportation (DOT)	This agency assures the coordinated, effective administration of the transportation programs of the Federal government and develops national transportation policies and programs conducive to the provision of fast, safe, efficient and convenient transportation at the lowest possible cost.
DHS	See California Department of Health Services.
Dike	An embankment or ridge, natural or man made, used to control the movement of liquids, sludges, solids, or other materials.
Dispersion	To spread, scatter, or diffuse through air, soil, surface or ground water.
Diversion	The intentional, controlled movement of a hazardous material to relocate it into an area where it will pose less harm to the community and the environment.
Division	That organizational level within the ICS having responsibility for operations within a defined geographic area. The "Division" Officer directs approximately 5 Companies, and answers to the "Operations" Officer.
Dose	The amount of substance ingested, absorbed, and/or inhaled per exposure period.
Double gloving	A set of gloves worn over those already in place for enhanced protection.
Downwind	In the direction in which the wind blows.
Ecosystem	A habitat formed by the interaction of a community of organisms with their environment.
Edema	The swelling of body tissues resulting from fluid retention.
Emergency Medical Services (EMS)	Functions as required to provide emergency medical care for ill or injured persons by trained providers. The State agency responsible for developing general guidelines for triage and handling of contaminated/exposed patients; develops and promotes hazardous materials training for emergency medical responders in the field and hospital emergency rooms; identifies and coordinates the procurement of medical assistance, supplies, and hospital beds when local and/or regional resources are depleted; and coordinates the evaluation of casualties to other areas of the State.

Emergency Operations Center (EOC)	The secured site where government officials exercise centralized coordination in an emergency. The EOC serves as a resource center and coordination point for additional field assistance. It also provides executive directives to and liaison for State and federal government representatives, and considers and mandates protective actions.
Emergency Operations Plan	A document that identifies the available personnel, equipment, facilities, supplies, and other resources in the jurisdiction, and states the method or scheme for coordinated actions to be taken by individuals and government services in the event of natural, man-made, and attack related disasters.
Emergency Response Personnel	Personnel assigned to organizations that have the responsibility for responding to different types of emergency situations. (NFPA 1991, 1-3)
Endothermic	A process or chemical reaction which is accompanied by absorption of heat.
Entry Point	A specified and controlled location where access into the hot zone occurs at a hazardous materials incident.
Entry Team Leader	The entry leader is responsible for the overall entry operations of assigned personnel within the hot zone. (FIREScope ICS-HM)
Environmental Protection Agency (EPA)	The purpose of the Environmental Protection Agency (EPA) is to protect and enhance our environment today and for future generations to the fullest extent possible under the laws enacted by Congress. The Agency's mission is to control and abate pollution in the areas of water, air, solid waste, pesticides, noise, and radiation. EPA's mandate is to mount an integrated, coordinated attack on environmental pollution in cooperation with State and local governments.
Etiological Agent	A viable microorganism or its toxin, which causes or may cause human disease.
Evacuation	The removal of potentially endangered, but not yet exposed, persons from an area threatened by a hazardous materials incident. (FIREScope ICSHM)
Explosive	Any chemical compound, mixture, or device, of which the primary or common purpose is to function by explosion, i.e., with substantial instantaneous
Exposure	The subjection of a person to a toxic substance or harmful physical agent through any route of entry.
Fahrenheit	The scale of temperature in which 212° is the boiling point of water at 760 mm Hg and 32° is the freezing point.
First Responder	The first trained person(s) to arrive at the scene of a hazardous materials incident. May be from the public or private sector of emergency services.

First Responder, Awareness Level FRA	Individuals who are likely to witness or discover a hazardous substance release who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. (8 CCR 5192(q)(6))
First Responder, Operations Level FRO	Individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. (8 CCR 5192(q)(6))
Flammable Liquid	Any liquid having a flash point below 100o F (37.8o C). (49 CFR 173.115(a))
Flashpoint	The minimum temperature of a liquid at which it gives off vapors sufficiently fast to form an ignitable mixture with air and will flash when subjected to an external ignition source, but will not continue to burn.
Food and Drug Administration (FDA)	Performs, directs, and coordinates detection and control activities which protect consumers against adulterated, misbranded, or falsely advertised foods, drugs, medical devices, and hazardous products.
Fully Encapsulating Suits	Chemical protective suits that are designed to offer full body protection, including Self Contained Breathing Apparatus (SCBA), are gas tight, and meet the design criteria as outlined in NFPA Standard 1991.
Fume	Airborne dispersion consisting of minute solid particles arising from the heating of a solid material such as lead, in distinction to a gas or vapor. This physical change is often accompanied by a chemical reaction, such as oxidation. Fumes flocculate and sometimes coalesce. Odorous gases and vapors should not be called fumes.
Gas	A state of matter in which the material has very low density and viscosity; can expand and contract greatly in response to changes in temperature and pressure; easily diffuses into other gases; readily and uniformly distributes itself throughout any container. A gas can be changed to a liquid or solid state by the combined effect of increased pressure and/or decreased temperature.
Group	Groups are established to divide the incident into functional areas of operation.
Habitat	The native environment of an animal or plant; the natural place for life and growth of an animal or plant.
Hazard	Any situation that has the potential for causing damage to life, property, and/or the environment.
Hazardous Chemical	A term used by the United States Occupational Safety and Health Administration HealthAdministration (OSHA) to denote any chemical that would be a risk to employees if exposed in the workplace. The list of hazardous chemicals is found in 29 CFR.

Hazardous Material (Hazardous materials)	A substance or combination of substances which, because of quantity, concentration, physical, chemical or infectious characteristics may cause, or significantly contribute to an increase in deaths or serious illness; and/or pose a substantial present or potential hazard to humans or the environment.
Hazardous Substance	Hazardous Substance, as used by the California Department of Toxic Substances Control, encompasses every chemical regulated by both the Department of Transportation (hazardous materials) and the Environmental Protection Agency (hazardous waste), including emergency response (8 CCR 5192).
Hazardous Waste Facility	Any location used for the treatment, transfer, disposal or storage of hazardous waste as permitted and regulated by the California Department of Toxic Substances Control.
Herbicide	An agricultural chemical intended for killing plants or interrupting their normal growth. (See Pesticides.)
High Performance Liquid Chromatography (HPLC)	A procedure used in organics analysis to separate chemical mixtures based on differential ionic absorption to various substrates. Hot Zone. An area immediately surrounding a hazardous materials incident, which extends far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone. This zone is also referred to as the “exclusion zone”, the “red zone”, and the “restricted zone” in other documents. (NFPA 472, 1-3)
Immediately Dangerous to Life or Health (IDLH)	An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual’s ability to escape from a dangerous atmosphere. (8 CCR 5192(a)3) Information Officer (IO) The individual assigned to act as the liaison between the Incident Commander and the news media, as well as other groups.
Incident	An event involving a hazardous materials or a release or potential release of a hazardous material.
Incident Action Plan (IAP)	A plan developed at the field response level which contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written.
Incident Command	A disciplined method of management established for the specific purpose of control and direction of resources and personnel.
Incident Commander (IC)	The individual responsible for overall management of the incident at the field level.
Incident Command System (ICS)	

Ingestion	The process of taking substances such as food, drink, and medicine into the body through the mouth.
Irritant	A material that has an anesthetic, irritating, noxious, toxic, or other similar property that can cause extreme annoyance or discomfort. (49 CFR)
Isolating the Scene	Preventing persons and equipment from becoming exposed to a release or threatened release of a hazardous material by the establishment of site control zones.
LC50 (lethal concentration, 50%)	The amount of a toxicant in air which is deadly to 50% of the exposed lab animal population within a specified time.
LD50 (lethal dose, 50%)	The amount of a toxicant administered by other than inhalation which is deadly to 50% of the exposed lab animal population within a specified time.
Leak	The uncontrolled release of a hazardous material which could pose a threat to health, safety, and/or the environment.
Level of Protection	In addition to appropriate respiratory protection, designations of types of personal protective equipment to be worn based on NFPA standards. <ul style="list-style-type: none">• Level A - Vapor protective suit for hazardous chemical emergencies.• Level B - Liquid splash protective suit for hazardous chemical emergencies.• Level C - Limited use protective suit for hazardous chemical emergencies.
Level One Incident	Hazardous materials incidents which can be correctly contained, extinguished, and/or abated utilizing equipment, supplies, and resources immediately available to first responders having jurisdiction, and whose qualifications are limited to and do not exceed the scope of training as explained in 8 CCR 5192, or California Government Code (CGC), Chapter 1503, with reference to “First Responder, Operational Level”.
Level Two Incident	Hazardous materials incidents which can only be identified, tested, sampled, contained, extinguished, and/or abated utilizing the resources of a Hazardous Materials Response Team, which requires the use of specialized chemical protective clothing, and whose qualifications are explained in 8 CCR 5192, or California Government Code (CGC), Chapter 1503, with reference to “Hazardous Materials Technician Level”.
Level Three Incident	A hazardous materials incident which is beyond the controlling capabilities of a Hazardous Materials Response Team (Technician or Specialist Level) whose qualifications are explained in 8 CCR 5192, or California Government Code, Chapter 1503; and/or requires the use of two or more Hazardous Materials Response Teams; and/or must be additionally assisted by qualified specialty teams or individuals.
Local Disaster Plan	A plan developed and used by local government for extraordinary events.
Local Emergency Planning Committee (LEPC)	A committee appointed by a State emergency response commission, as required by SARA Title III, to formulate a comprehensive emergency plan for its corresponding Office of Emergency Services mutual aid region.

Lower Explosive Limit (LEL)	The lowest concentration of the material in air that can be detonated by spark, shock, or fire, etc.
Mutual Aid	An agreement to supply, if available, specifically agreed upon aid or support in an emergency situation between two or more agencies, jurisdictions, or political sub-divisions without the expectation of reimbursement.
Narcosis	Stupor or unconsciousness produced by chemical substances.
National Fire Protection Association (NFPA)	An international voluntary membership organization to promote improved fire protection and prevention, establish safeguards against loss of life and property by fire, and writes and publishes the American National Standards.
National Institute for Occupational Safety and Health (NIOSH)	A Federal agency which, among other activities, tests and certifies respiratory protective devices, air sampling detector tubes, and recommends occupational exposure limits for various substances.
National Response Center (NRC)	A communications center operated by the United States Coast Guard headquarters located in Washington, DC. They provide information on suggested technical emergency actions, and must be notified by the spiller within 24 hours of any spill of a reportable quantity of a hazardous substance.
Necrosis	Death in a particular part of a living tissue.
Nephrotoxic	A substance that negatively affects the kidneys.
Neurotoxic	A substance that negatively affects the nervous system.
Occupational Safety and Health Administration (OSHA)	Component of the United States Department of Labor; an agency with safety and health regulatory and enforcement authorities for most United States industries, businesses and States.
On-Scene Coordinator (OSC)	As explained in the National Contingency Plan, it is the pre-designated Federal official who coordinates Federal activities at a hazardous material incident, and monitors the incident for compliance with Federal pollution laws.
Operations	The coordinated tactical response of all field operations in accordance with the Incident Action Plan. A concentration of oxygen insufficient to support life.
Oxygen Deficient Atmosphere	An atmosphere which contains an oxygen content less than 19.5 % by volume at sea level.

Pallets	A low portable platform constructed of wood, metal, plastic, or fiberboard, built to specified dimensions, on which supplies are loaded, transported, or stored in units.
Parts Per Million (ppm)	A unit for measuring the concentration of a particular substance equal to one (1) unit combined with 999,999 other units.
Pathogen	Any disease producing organism, including viruses.
Penetration	The movement of liquid molecules through a chemical protective clothing, suit, garment or material.
Permeation	The movement of vapor or gas molecules through a chemical protective garment material.
Permissible Exposure Limit (PEL)	The employees' permitted exposure limit to any material listed in Table Z-1, Z-2, or Z-3 of OSHA regulations, section 1910.1000, Air Contaminants.
Personal Protective Equipment (PPE)	Equipment provided to shield or isolate a person from the chemical, physical, and thermal hazards that may be encountered at a hazardous materials incident. Adequate personal protective equipment should protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing. Personal protective equipment includes- personal protective clothing, self contained positive pressure breathing apparatus, and air purifying respirators. (NFPA 472, 1-3)
Pesticides	A chemical or mixture of chemicals used to destroy, prevent, or control any living organism considered to be a pest. pH A numerical designation of the negative logarithm of hydrogen ion concentration. A pH of 7.0 is neutrality; higher values indicate alkalinity and lower values indicate acidity.
Plume	A vapor, liquid, dust or gaseous cloud formation which has shape and buoyancy.
Poison Control Centers	California is served by four certified and designated regional poison control centers. Each PCC is available 24 hours a day and can provide immediate health effects, scene management, victim decontamination, and other emergency medical treatment advice for hazardous materials emergencies. A physician specializing in medical toxicology is available for back-up consultation.
Radioactive	The spontaneous disintegration of unstable nuclei accompanied by emission of nuclear radiation.
Radioactive Material (RAM)	Any material, or combination of materials, that spontaneously emits ionizing radiation and has a specific activity greater than 0.002 microcuries per gram. (49 CFR 173.389)
Rescue	The removal of victims from an area determined to be contaminated or otherwise hazardous by appropriately trained and equipped personnel.

Residue	A material remaining in a package after its contents have been emptied and before the packaging is refilled, or cleaned and purged of vapor to remove any potential hazard.
Response	That portion of incident management where personnel are involved in controlling a hazardous material incident. (NFPA 472, 1-3)
Safety Data Sheet (SDS)	A document which contains information regarding the specific identity of hazardous chemicals, including information on health effects, first aid, chemical and physical properties, and emergency phone numbers. Mitigation Any action employed to contain, reduce, or eliminate the harmful effects of a spill or release of a hazardous material.
Safety Officer	Selected by the Incident Commander, a person at an emergency incident responsible for assuring that all overall operations performed at the incident by all agencies present are done so with respect to the highest levels of safety and health. The Safety Officer shall report directly to the Incident Commander.
Scenario	An outline of a natural or expected course of events.
Scene	The location impacted or potentially impacted by a hazard.
Self Contained Breathing Apparatus(SCBA)	A positive pressure, self-contained breathing apparatus (SCBA) or combination SCBA/supplied air breathing apparatus certified by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA), or the appropriate approval agency for use in atmospheres that are immediately dangerous to life or health (IDLH). (NFPA 1991, 1-3)
Sheltering In Place/ InPlace Protection	To direct people to quickly go inside a building and remain inside until the danger passes.
Short Term Exposure Limit (STEL)	See Threshold Limit Value –Short Term Exposure Limit (TLV-STEL).
Site	Any facility or location within the scope of 8 CCR 5192(a)(3).
Sludge	Accumulated solids, semisolids, or liquid waste generated from wastewaters, drilling operations, or other fluids.
Solubility	The ability or tendency of one substance to blend uniformly with another.
Staging Area	The area established for temporary location of available resources closer to the incident site to reduce response time.
State Warning Center (OES Warning Center)	The Governor’s Office of Emergency Services Warning Center facilitates emergency communications with government agencies at all levels. The could cause a disaster and is the central reporting office for any release or threatened release of a hazardous material. The Warning Center is the initial point in the state where coordination begins to mobilize federal, state and local agencies during a disaster.
Synergistic Effect	The combined effect of two chemicals which is greater than the sum of the effect of each agent alone.
Systemic	Pertaining to the internal organs and structures of the body.

Team Leader	See Entry Team Leader. Person assigned to document activities of the Hazardous Material Team and gather information relevant to the chemicals involved and their hazards.
Termination	That portion of incident management where personnel are involved in documenting safety procedures, site operations, hazards faced, and lessons learned from the incident. Termination is divided into three phases- Debriefing, Post-Incident analysis, and Critique. (NFPA 472, 1-3) (See Post-Incident Analysis.)
Threshold Limit Value(TLV)	The value for an airborne toxic material that is to be used as a guide in the control of health hazards and represents the concentration to which nearly all workers may be exposed 8 hours per day over extended periods of time without adverse effects.
Toxic	Poisonous; relating to or caused by a toxin; able to cause injury by contact or systemic action to plants, animals or people.
Traffic Control/ CrowdControl	Action(s) by law enforcement to secure and/or minimize exposure of the public to unsafe conditions resulting from emergency incidents, impediments and congestion.
Treatment	Any method, technique, or process which changes the physical, chemical, or biological character or composition of any hazardous waste, or removes or reduces its harmful properties or characteristics for any purpose.
United Nations (UN) Identification Number	When UN precedes a four-digit number, it indicates that this identification number is used internationally to identify a hazardous material.
Upper Explosive Limit(UEL)	The highest concentration of the material in air that can be detonated.
Vapor	An air dispersion of molecules of a substance that is normally a liquid or solid at standard temperature and pressure.
Vulnerability	The susceptibility of life, the environment, and/or property, to damage by a hazard.
Warm Zone	The area where personnel and equipment decontamination and hot zone support takes place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. This is also referred to as the “decontamination”, “contamination reduction”, “yellow zone”, or “limited access zone” in other documents. (NFPA 472, 1-3)

Participants Manual: Chapter 3

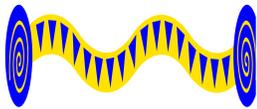
Safety, Isolation, Notifications

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter introduces the Awareness Level Actions of Safety, Isolation and Notification and discusses the procedures for Directed Self Decontamination.



Time	Instructor/Participant Ratio	Method of Instruction
------	------------------------------	-----------------------

2 hours

1/30

Facilitated Seminar



Terminal Objective

At the end of this chapter participants will be able to initiate the Awareness Level Actions of Safety, Isolation and making proper Notifications in a hazardous materials incident.



Enabling Objectives

1. Describe the First Operational Thought
2. Understand the limits of the Awareness Level
3. Describe the First Operational Action
4. Describe the proper procedures of making notifications in a hazmat incident
5. Understand the concept and procedure for directed self-decontamination.

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResB1b 1.1.1	Develop procedures to identify and assess hazards
Res B1f 1	Develop plans, policies, procedures and systems for public information, alert/warnings and notifications
ResB2b 5.2.1	Identify hazardous materials and extent/scope of incident
Res B2b 8.1	Identify assest required for decontamination activities



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)



Supporting Materials

- Course Outline
- Participant Manual

Activities

- Easel Charts for Brainstorming



SAFETY
ISOLATION
NOTIFICATION



SIN: The Correct Awareness Level Response to Internal Spills and Contaminated Patients

Slide 3.1

Now let's talk about what you do at the Awareness Level when you encounter a Hazardous Materials situation.

You SIN!

SAFETY (First, last, and always)

Don't be a Dead Hero!

- Get the big picture.
- Can you handle it?
- What are the risks?
- What do you know?
- What don't you know?

Slide 3.2

Safety is the MOST important thing. Your Safety comes first.

It is the First Operational Thought.

It doesn't help for you to take unprotected or uninformed actions if it incapacitates or kills you.

I SOLATE

- Isolate the scene and deny entry.

– (if someone has something on them don't let them go away. If others haven't been exposed don't let them have contact with the chemicals.)

Slide 3.3

Discuss how this would be done in an:

Internal event: shutting doors, barricades, posting personnel to isolate area.

External event: barricade, caution tape, establishing a perimeter, posting "guards".

NOTIFY

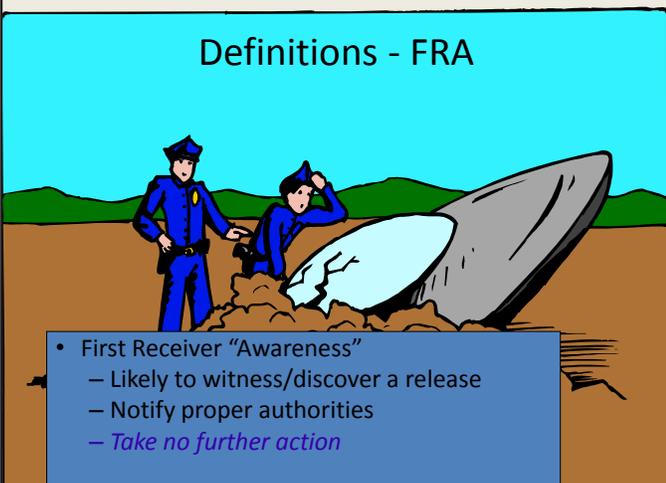
- Call the hospital operator to announce a Code Orange (or site specific name)
- Call your Supervisor
- Call your Hazmat Coordinator
- Have the operator call 911

Slide 3.4

Hazmat incidents both internal and external require that notifications be made. What is your facility code for a Hazmat incident?

At a minimum you should notify the operator and your supervisor. Procedures should be in place for the operator to notify 911.

Definitions - FRA



- First Receiver "Awareness"
 - Likely to witness/discover a release
 - Notify proper authorities
 - *Take no further action*

Slide 3.5

This slide defines the role of the First Receiver at the Awareness Level.

First Operational Thought

- First operational **thought** is **safety**
 - Safety starts with first receiver on-scene
 - All must have positive safety attitude



Slide 3.6

Safety is an operational thought, not an action.

Conduct Safe Assessment

- Conduct size-up!
- Don't get close enough for positive ID
- Slow down, shut-off A/C, observe area
- Don't touch suspected contaminated patients

Slide 3.7

Evaluate the situation. Don't get too close if you suspect a hazmat. **SLOW DOWN.** Do not become part of the problem.

Isolation First Operational Priority

- **FROs — usually isolate and deny entry by establishing a "Perimeter"**
- **How do you set up perimeters in the Hospital ?**

– Use **ERG** recommendations



Slide 3.8

Isolation is the first Operational Action. Keep yourself and others from becoming contaminated.

Isolation First Operational Priority



- **Dilemma**
 - Safe distance vs. control of Perimeter
 - If too large will require more resources.

Slide 3.9

Be realistic about how much area you can isolate until enough resources are available.

Perimeters & Control Zones

- Purpose of Perimeters & Control Zones
 - Ensure safety and isolation
 - Control the scene
 - Limit spread of contamination
 - Allow for safe working area



Slide 3.10

Establishing the Perimeter is essential.

To ensure safety and isolation, limit contamination spread, control scene & allow for activities such as decontamination.

Main operational difference between Perimeter & Zones —FRO's usually set Perimeters and Tech's/Specialists set Zones.

Control Access to Perimeter

- 
- Deny entry to all
 - Stage receivers not assigned
 - Establish emergency exit procedures
 - Establish control zones
 - If outside watch for wind shifts

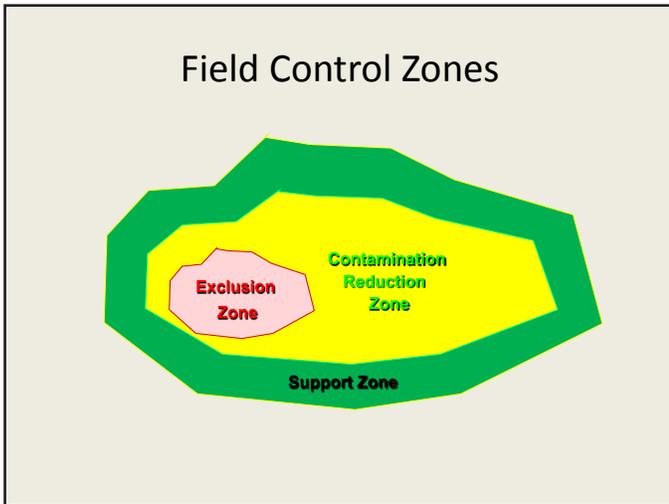
Slide 3.11

Control Zones will be covered more in the FRO course.

Exclusion/Hot Zone: Area of isolation (only responders with proper level of protection, as determined by Haz Mat Group and enforced by Safety Officer are allowed in this Zone).

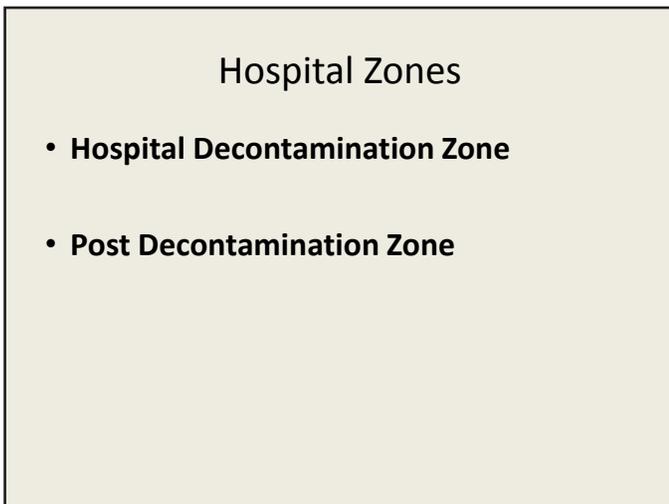
Contamination Reduction/Warm Zone: Used to control areas such as Decontamination (reduced levels of protection might be used).

Support/Cold Zone — Safe area for Command Post, Media, etc. (No protective clothing or respiratory protection required).



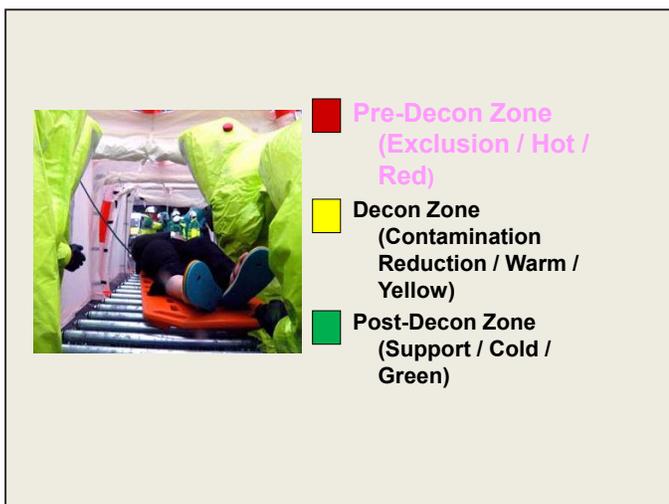
Slide 3.12

This diagram shows how the zones may lay out at an incident. This will look different at a hospital.



Slide 3.13

Identification of zones. Hospitals use a modified version of the zones.



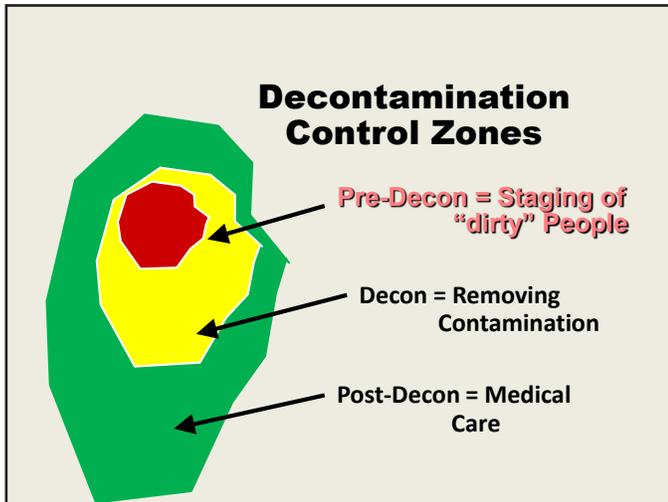
Slide 3.14

We often use color codes in association with the zones.

Pre-decontamination zone (HOT)= Red
Hospital Decon Zone (WARM) = Yellow
Post-Decon (Support) = Green

Slide 3.15

Here is what happens in each zone.



Slide 3.16

Video on decontamination



Slide 3.17

Notifications: who do you need to contact?

Activate your facility protocols. Code Orange, etc.

Every facility should have someone designated as the Haz Mat Coordinator. Depending on the size of the facility, this person may or may not have much hazmat experience. But they are responsible.

If the situation is bad, or people need rescue, 911 should be initiated. Get someone there with higher levels of protection.

Note: If you need help, ask for it. Generally the local resources are contacted first (e.g., fire, law, environmental management). Know your local capabilities.

Notification Requirements

- **Mandatory Notifications**
 - Local 911 (Local Dispatch)
 - CUPA/Administering Agency
 - State Warning Center (800-852-7550)
 - National Response Center (800-424-8802)

Slide 3.18

External- In the event outside resources are required notify 911. They will usually make the other notifications.

Notification Requirements

- **Receivers — make same notifications as back-up**
- **RP must make “mandatory” notifications**
 - Possible civil/criminal penalties for non-notification!



Slide 3.19

Other notifications

S **N**OTIFICATION



- **Call the hospital operator to announce a Code Orange (or site specific name)**
- **Call your Supervisor**
- **Call your Haz Mat Coordinator**
- **Have the operator call 911, if necessary**

Slide 3.20

Internal notifications need to be made. Notify the operator, supervisor, and hazmat coordinator. Ensure 911 has been notified.

Directed Self Decontamination

What are your first concerns?



- Is this patient contaminated with a hazardous material?
- How can contamination of the ED and its occupants (patients and staff) be minimized?
- How can the patient be managed so that he can receive medical care?

Slide 3.21

What are the concerns when there is a contaminated patient? (in the context of Awareness Level training).

1st - Is the patient contaminated? How dangerous is the contamination? Is there a danger of secondary contamination?

2nd - It must be a priority to prevent or reduce contamination of the Emergency Department.

This includes contamination of staff and other patients.

3rd - Actions need to be taken as promptly as possible (without sacrificing safety). Does the patient need medical care, need to decon so the patient can receive medical treatment.

Directed Self Decontamination
(continued)

What are your first ACTIONS?

S SAFETY: Do not touch the patient or allow anyone else to have patient contact.

I ISOLATION: Get the patient out of the ED to a predesignated location!!!

N NOTIFICATION: Activate your facility's protocol for a haz mat incident.

Slide 3.22

Here are your initial actions before initiating “Directed Self Decontamination”



Slide 3.23

[show video, “Fresno Fire, Self Assessment, Decontamination”, segment with patient presenting to the Triage nurse]

I. Discuss the clues that were seen.

Trash Bag Decon

A kit intended to allow for:

- directed self-decon without modesty screens using a large(!) opaque plastic bag
- placing potentially contaminated clothing in double clear plastic bags
- placing valuables in a separate sealable clear plastic bag
- tracking of patients
- clothing a decontaminated patient



Slide 3.24

[handout - "Trash Bag Decon kit" contents]

Your facility may not have Decon showers, so what can you do. Maintaining modesty screening is important.

So this is the lowest tech method you can use if you don't have showers or capabilities for modesty screening.

Even if you do have showers, using these "Trash Bag Decon kits" can be helpful in managing valuables and clothes. IE: The bags are pre-numbered with matching arm bands.

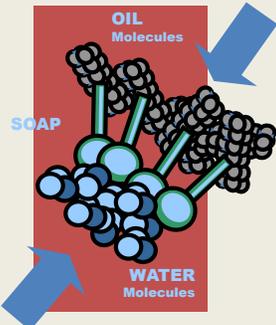
[Demonstrate contents and use of contents. Patient would need to be directed to put valuables in smaller bag (leave glasses on), put black trash bag on over head, take all clothes off underneath, place clothes in larger bag, double bag into big bag all the contents came in. Wash with large amount of water, can put hose right under bag. Can dry off and put on gown or coveralls under bag, then take the bag off.

I. Remember you must SIN.

How Soap (Surfactants) Works.

Soap breaks the surface tension of the water and makes the "water wetter."

Soap attracts the water soluble contaminants to one end of the molecule and oil soluble contaminants to the other end and carries them away.



Slide 3.25

There may be a question of what to use to Decon someone.

Soap and Water is the best.

Use a mild, liquid soap. (Small bottles of surgical soap or baby shampoo work well.) Can have buckets of water with soap in it. Provide soft long handled brushes, wash clothes or sponges. Do not use bars of soap - people have a tendency to scrub too hard.



Step A

- Open this package and find the clear bag.
- Remove your over garments, and shoes.
- Place these items in the clear bag.

Thanks to Anna Valdez, RN for use of these slides

Slide 3.26

These are the steps in Directed Self Decontamination using the Trash Bag Technique.



Step B

- Remove your personal items such as your watch, jewelry, and valuables and place them in the small Ziploc bag.

Slide 3.27

The kit should have a bag for personal items.



Step C

- With the pen, write your name on the label on the clear bag.
- Attach the label to the large clear bag.

Slide 3.28

It is important to identify personal belongings.



Step D

- Find the black plastic bag and place it on you over your clothing like a poncho.

There are holes for your head and arms.

Slide 3.29

Here a large opaque trash bag is used to protect the modesty of the victim. Modesty protection is very important. Screens and shelters may also be used.



Step E

- Now bring your arms inside of the poncho type plastic bag you are wearing and undress.
- Remove all clothing, including underwear and socks.
- Place all clothing in the clear bag.

Slide 3.30

When no other modesty protection is available the victim may disrobe while covered with the trash bag.



Step F

- Use the sponge and soap that is inside of this bag to wash any residue from your body.
- Await further decontamination instructions.

Slide 3.31

The bag may be left in place as the victim washes and rinses.



Slide 3.32

Demonstrate Directed Self Decon for the class.
This may be an outside activity.

Review

- Questions
- Post Assessment
 - must have name on top
- Module Evaluation
 - name optional

Supplemental Material

Safety, Isolation and Notifications: (S.I.N.)

Main Points

- Definition of “First Receiver” & “SIN”
- The First Operational Thought—Safety
- The First Operational Priority—Isolation
- The First Operational Alert—Notifications

Block Outline

1. **Definition of First Receiver and “SIN.”**
 - a. **Definition of First Receiver Awareness and Operations levels:**
 - 1) First Receiver “Awareness”: One likely to witness or discover a Haz Mat release and can initiate a response by notifying authorities, taking no further actions (SIN only). 29 CFR 1910.120(q)(6)(i), Title 8 CCR 5192(q)(6)(A).
 - 2) First Receiver “Operations”: One who responds to Haz Mat releases for purpose of protecting nearby persons, environment or property — trained in a defensive fashion without trying to stop the release. (SINCIAPCPDDD). 29 CFR 1910.120(q)(6)(ii), Title 8 CCR 5192(q)(6)(B).
 - b. **Definition of “SIN:”**
 - 1) Safety,
 - 2) Isolation,
 - 3) Notifications.
 - c. All Haz Mat receivers should “SIN” at the basic initial on-scene actions at all Haz Mat incidents.

Response/Receiving Levels.

First Receiver “Awareness” vs. “Operations”

Awareness	Operations
Likely to witness or discover a release.	Likely to witness or discover a release.
Initiate an emergency response.	Initiate an emergency response.
Notify the authorities of the release.	Notify the authorities of the release.
	Respond to release in defensive fashion.
	Protect persons, property & environment.
	Contain the release from a safe distance.

First Receiver vs. Technician/Specialist

Awareness/Operations	Tech-Spec
Part of <i>initial</i> response.	Implement emergency response plan.
Respond to release in <i>defensive</i> fashion.	Assume a more aggressive role.
Contain the release from a safe distance.	Control or stop the release.

2. The First Operational Thought — SAFETY.

- a. The first operational thought for everyone = Safety!
 - 1) Safety starts with the first contact with the patient in the hospital!
 - 2) Receivers must have a “Positive Safety Attitude.”
- b. Three techniques to ensure safety and a positive safety attitude:
 - 1) Safe Approach,
 - 2) Safe Assessment,
 - 3) Key Safety Guides for all receivers to follow.
- c. Approach Haz Mats from a safe direction (Upwind, Upgrade & Upstream), and a safe distance (per ERG).
- d. Conduct a safe assessment/size-up:
 - 1) Do not get close enough for positive identification.
 - 2) Slow vehicle down, shut off air/ventilation and observe area.
 - 3) Use binoculars to identify/assess incident.
- e. Desired First Receiver initial actions:
 - 1) Safe approach at a safe distance,
 - 2) Isolate and deny entry,
 - 3) Make initial Notifications,
 - 4) Establish temporary command.

S.I.N.

First Operational Thought: *Safety*



First Operational Priority: *Isolate and Deny Entry*



First Operational Alert: *Notifications*



Not all notifications are mandatory but the following are:

- *Local Dispatch*
Local 911
- *Administering Agency/CUPA*
???-????
- *State OES/Warning Center*
800-852-7550
- *National Response Center*
800-424-8802

Note: Specific incidents may require other notifications!

2. The First Operational Thought — SAFETY (cont.)

- f. Ten key safety guides for hospitals:
 - 1) Be cautious; treat materials as hazardous until proven otherwise.
 - 2) Approach upwind, upgradient and upstream.
 - 3) Keep safe distance until IDHA complete and risk is confirmed.
 - 4) Isolate and deny entry (limit number of receivers).
 - 5) Do not rush to victims without doing a risk assessment (Risk vs. Gain) and wearing proper protective equipment.
 - 6) Do not touch, taste or breathe unknown released material (do not assume vapor is harmless due to lack of smell).
 - 7) Do not eat, drink or smoke in incident area.
 - 8) Eliminate all ignition sources near incident area.
 - 9) Establish and observe safety perimeters and control zones.
 - 10) Do not worry about looking foolish (your health and the health of others is at stake), think safety!

- g. OSHA regulations, 29 CFR 1910.120(q) and Title 8 CCR 5192(q), require IC to designate a Safety Officer/Officer.
 - 1) Safety Officer ensures safety on scene by conducting safety-related activities—can suspend any unsafe act.
 - 2) Checklist of safety “Rules” vs. “Guides” may provide better tool for “Safety Officer” to enforce safe response on scene.

Safety Official

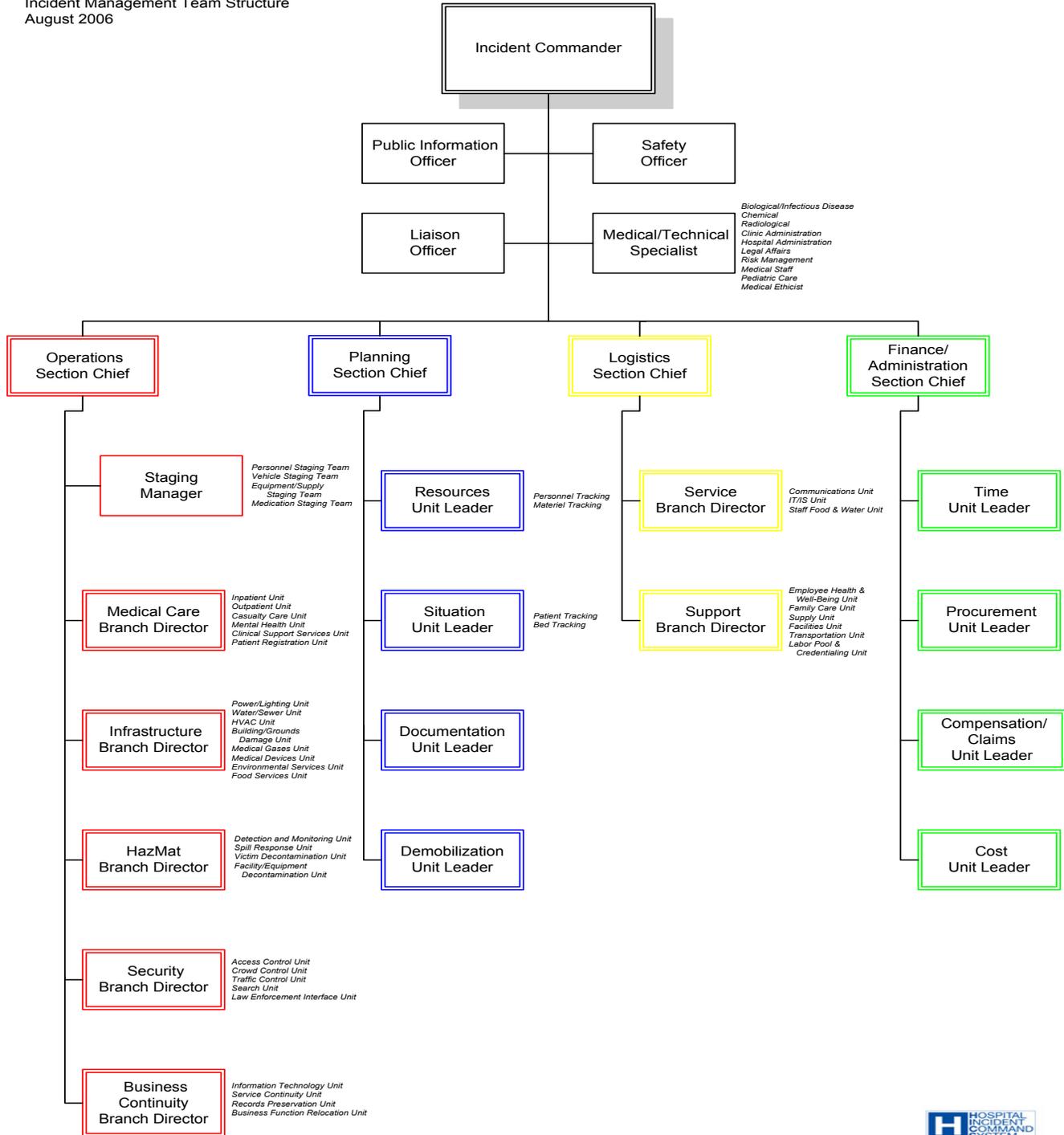
29 CFR 1910.120(q)(3), Title 8 CCR 5192(q)(3)

“(vii) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of the operations for the emergency at hand.

(viii) When activities are judged by the safety official to be an IDLH and/or to involve an imminent danger condition, the safety officer shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.”

HICS Hazardous Materials Group Organizational Chart

Hospital Incident Command System
Incident Management Team Structure
August 2006



3. The First Operational Priority — ISOLATION

- a. The first operational priority = Isolate and deny entry!
 - 1) Receivers can safely attempt to isolate and deny entry by establishing Perimeters & Control Zones via ERG.
 - 2) The dilemma of distance in safety vs. isolation (distance is safety's #1 ally, while it is isolation's #1 enemy).

- b. Perimeter and Zones
 - 1) Purpose: ensure safety and isolation, control the scene, limit contamination spread and allow for safe working areas.
 - 2) Main difference: FRAs and FROs usually set up Perimeters, while Technicians/Specialists set up Control Zones.

- c. Perimeter and Control Zone terminology:
 - 1) Perimeter - Outside security line around all Control Zones.
 - 2) Exclusion/Hot Zone - Area of isolation (only responders/receivers with a specific task & proper level of protective clothing in this Zone).
 - 3) Contamination Reduction/Warm Zone - Used to control areas like Safe Refuge and Decontamination (may use a reduced protective clothing level in this Zone).
 - 4) Support/Cold Zone - Safe area for Command Post, media, medical aid, etc. (No protective clothing or SCBA required).

Exclusion Zone, Contamination Reduction Zone and Support Zone are all within the Perimeter.

Remember in a hospital and/or emergency room setting, the PATIENT may BE the Hot Zone!

Perimeters and Zones

First Operational Thought — *Safety*

First Operational Priority — *Isolate & Deny Entry...*
Via Perimeter and Zones

Perimeter: Security line surrounding control zones to isolate and deny entry to any unnecessary people, usually established by law enforcement.

Zone: Zones to ensure safety, limit spread of the hazard, control hazard area, conduct decon and support emergency operations as established by Haz Mat Group/Team.

Examples: **Exclusion Zone:** Also called Hot Zone, Red Zone, Inner Perimeter.
Contamination Reduction Zone: Also called Warm Zone, Yellow Zone, Secondary Perimeter. *This is where Decontamination occurs!*
Support Zone: Also called Cold Zone, Green Zone, Outer Perimeter.
Control Zone terms from *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH Publication 85-115, October 1985.



3. The First Operational Priority — ISOLATION (cont.)

- d. Perimeter Control Objectives:
 - 1) Control “Entry Points” (secure doors, stairways, gates, etc.).
 - 2) Control “Perimeter” between all Entry Points.
 - 3) Control “Access” inside Perimeter (incl. responders/receivers).

- e. Perimeter Control Tactics:
 - 1) Determine size and extent of perimeter (per ERG, downwind perimeter will usually be longer),
 - 2) Identify all entry points,
 - 3) Control all entry points,
 - 4) Identify and establish boundaries for perimeter,
 - a) Unstaffed barricades usually ineffective,
 - b) Use existing barriers.
 - 5) Control access to the perimeter,
 - a) Deny entry to all unauthorized personnel (including unnecessary hospital personnel),
 - b) Stage all workers without an immediate mission,
 - c) Establish emergency exit procedures for all workers.

- f. The IC is ultimately responsible for Perimeters and Control Zones (may need tactical plans and prearranged logistics to manage this).

Isolation and Deny Entry Objectives

Entry Points:

Control Entry Points

- Visually determine isolation distance for Perimeter.
- Identify closest entry/control points for Perimeter. (e.g. doorways, gates, etc.) Others: _____
- Start with most obvious and most commonly used Perimeter entry point. (FEMA studies have shown people will evacuate through exits they are accustomed to using.)
- Make early request for sufficient units to secure entry points. (Use Hospital Security, Law Enforcement or Auxiliary/Reserve Units. Give incident location and safe routes for ingress.)
- Use all available methods of restricting access (e.g. barricades, cones, etc.) Others: _____
- Identify staging areas for receivers.

Hazard:

Control Area Around Hazard

- Secure the area around the hazard area.
- Use tape, natural barriers, patrols, etc.
- Remember, it's easier to make a perimeter smaller than bigger after you establish it. Don't be afraid to start big.

Perimeter:

Control Access Inside Perimeters

- Keep public and nonessential receivers out.
- Maintain patrol of perimeter area.
- Provide security for Support Zone work areas.
- Provide traffic control as necessary.
- Maintain communication with security group at all times!
- Have an emergency escape route!!

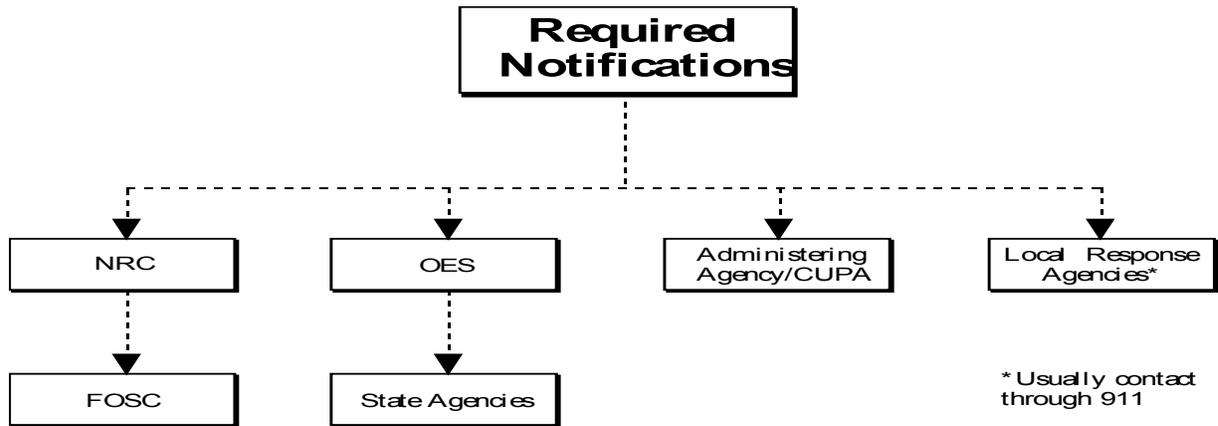
4. The First Operational Alert — NOTIFICATIONS

- a. Three types of “Notifications” to alert others of a Haz Mat event:
 - 1) “Mandatory” Notifications,
 - 2) “Resource” requests,
 - 3) “Report of Conditions.”

- b. Responsible Party must notify authorities of a Haz Mat release or potential release. Criminal penalties are possible for non-notification.
 - 1) Receivers should make the same notifications as back-up.
 - 2) Mandatory notifications:
 - a) Local dispatch (Local 911),
 - b) CUPA/Local Administering Agency
(#:_____),
 - c) State Warning Center (800-852-7550),
 - d) National Response Center (800-424-8802).
 - 3) Other notifications per specific incident:
 - a) Pesticide spill - County Agriculture,
 - b) Spill in state waters - OES (who must notify RWQCB, OSPR & State Lands Commission),
 - c) Spill on state highway/freeway (incl. county roads) – CHP
 - d) Radiological release - DHS (Radiological Branch),
 - e) Release impacting state wildlife – DFG,
 - f) Acutely hazardous material within 1/2 mile of school
- School District Superintendent, Prop 65 Haz Mats -
Board of Supervisors & Health Officer.

Note: Receivers must make notifications for f)

Legal Requirements for Notifications



- NRC:* “Notice of an oil discharge or release of a hazardous substance in an amount equal to or greater than the reportable quantity must be made immediately...to the NRC duty...” 40 CFR 300.125(c).
- CUPA/AA:* “(a) ... provide an immediate, verbal report of any release or threatened release of a hazardous material to the Administering Agency and the [OES]...(d) The [AA] may designate a call to the 911 ... as meeting the requirement to call the [AA].” Title 19 CCR 2703.
- CalEMA:* “... immediately report any release or threatened release of a hazardous material to the administering agency and the [California Emergency Management Agency].” §25507, California Health & Safety Code.
- Transportation:* “...each carrier who transports hazardous materials (including hazardous wastes) shall give notice in accordance with paragraph (b) of this section after each incident...” 49 CFR 171.15 (federal regulation) Title 13 CCR 1166 (equivalent California regulation).
- Schools:* “Emergency rescue personnel...shall immediately advise the superintendent...where the location of the release or threatened release is within one-half mile of a school.” §25507.10 California Health & Safety Code.
- Oil:* “Any local or state agency responding to a spill of oil shall notify the Office of Emergency Services, if notification...has not occurred.” §8670.26 California Government Code.

4. The First Operational Alert — NOTIFICATIONS (cont.)

- 4) General information needed for mandatory notifications:
 - a) Name/Agency of person reporting,
 - b) Location of Haz Mat release,
 - c) Haz Mat involved,
 - d) Nature of problem,
 - e) Quantity released,
 - f) Potential hazards, etc.
 - 5) Key point of notification for state agencies is State Warning Center.
 - a) CalEMA will provide IC with control number.
 - 6) Notification checklist may help
- c. Resource Request Notification
- 1) Types of resources:
 - a) Agencies/Personnel (Law, Fire, EMS, Health, etc.),
 - b) Materials/Equipment (Haz Mat Team),
 - c) Facilities (ICP, EOC, evacuee shelters, etc.),
 - d) Other (Information sources, Haz Mat Teams, etc.).
 - 2) Criteria when additional resources needed:
 - a) Size, type and nature of incident vs. your resources,
 - b) Availability and training of personnel,
 - c) Availability and sophistication of apparatus and equipment,
 - d) Amount, type and access of supplies and expertise.
 - 3) Possible off-site resources (CHEMTREC, CHLOREP, USA and Poison Control Centers).
Other: _____
 - 4) Non-Governmental Organizations.
 - a) American Red Cross, Salvation Army, etc.

When Do You Need Help?

You don't have enough stuff.



You don't have enough people.



You don't have the right stuff.



You just need "more"!



4. The First Operational Alert — NOTIFICATIONS (cont.)

- 5) Know your local resources for Haz Mat and request early.
 - a) Request all Haz Mat response agencies early.
 - b) Know Mutual Aid for area Haz Mat Teams, local industry, State & Federal Haz Mat resources that can help.
 - c) Stage incoming resources until needed and give arriving resources a safe route of access.
 - 6) Accessing resources implies pre-awareness and contact lists.
 - a) Develop points of contact and notification lists.
 - b) Need “user-friendly” Haz Mat resource list.
 - 7) You are not alone (many Haz Mat resources are available), but you must contact, coordinate and manage resources properly!
- d. Report of Conditions Notification.
- 1) Report of Conditions includes:
 - a) What you see in and around hazard area,
 - b) What you want,
 - c) What you are doing.
 - 2) Report of Conditions helps IC assess basic actions, identify needed resources, and begin the IDHA process.

Haz Mat Notification Guide

Agency/Organization	Phone #	Time	Person Notified
Local			
First Resp/Rec (Fire, PD, etc.)*	_____	_____	_____
Administering Agency*	_____	_____	_____
County OES	_____	_____	_____
County Agriculture Dept.	_____	_____	_____
County Health	_____	_____	_____
Local Haz Mat Team	_____	_____	_____
Animal Control	_____	_____	_____
Other	_____	_____	_____
State			
OES Warning Center*	_____	_____	_____
Highway Patrol	_____	_____	_____
Fish and Game	_____	_____	_____
Dept. of Toxic Substances Control	_____	_____	_____
Other	_____	_____	_____
Federal			
National Response Center*	_____	_____	_____
Coast Guard	_____	_____	_____
EPA Region IX	_____	_____	_____
Other	_____	_____	_____
Private			
CHEMTREC	_____	_____	_____
Local Cleanup Company	_____	_____	_____
Underground Services Alert	_____	_____	_____
Regional Poison Control Center	_____	_____	_____
Hospitals	_____	_____	_____
Other	_____	_____	_____
Special Districts			
Air Quality Mgt. District	_____	_____	_____
Regional Water Quality Cntl. Brd.	_____	_____	_____
Flood Control Districts	_____	_____	_____
School Districts	_____	_____	_____
Sewer Districts	_____	_____	_____
Other	_____	_____	_____

*Mandatory Notifications

Do This!

DO	think safety and consider it a big deal!!!
DO	report your location.
DO	stay upwind, uphill and upgrade.
DO	isolate and deny entry.
DO	establish perimeters and observe zones.
DO	notify and request assistance early.
DO	establish command & practice unity of command.
DO	complete identification and assessment.
DO	have alternative plans and consider no action.
DO	recognize your limits.
DO	forecast your intervention and expect change.
DO	weigh risk against gain (benefits).
DO	wear protective clothing.
DO	maintain control of the incident.
DO	evacuate and warn public early.
DO	decontaminate & document before demobilization.
DO	communicate & coordinate with other agencies.
DO	ensure the safety of all on-scene personnel!
DO	
	(Fill in your recommendation)

Don't Do This!

DON'T	be overly aggressive.
DON'T	have a negative safety attitude.
DON'T	get coaxed into a bad situation.
DON'T	touch, breathe or swallow it.
DON'T	act without a plan.
DON'T	lose sight of your mission.
DON'T	act on emotion.
DON'T	confuse rescue with evacuation.
DON'T	believe everything you're told.
DON'T	intervene unless sure of positive outcome.
DON'T	drive through spills or clouds.
DON'T	pick up or move containers needlessly.
DON'T	key in on only one hazard.
DON'T	take victims to the incident.
DON'T	let small amounts fool you.
DON'T	use flares.
DON'T	be lulled into a false sense of security.
DON'T	fail to competently respond to the event!
DON'T	
	(Fill in your recommendation)

Participant Worksheet

1. In your own words, identify three objectives for setting the “Perimeter”:

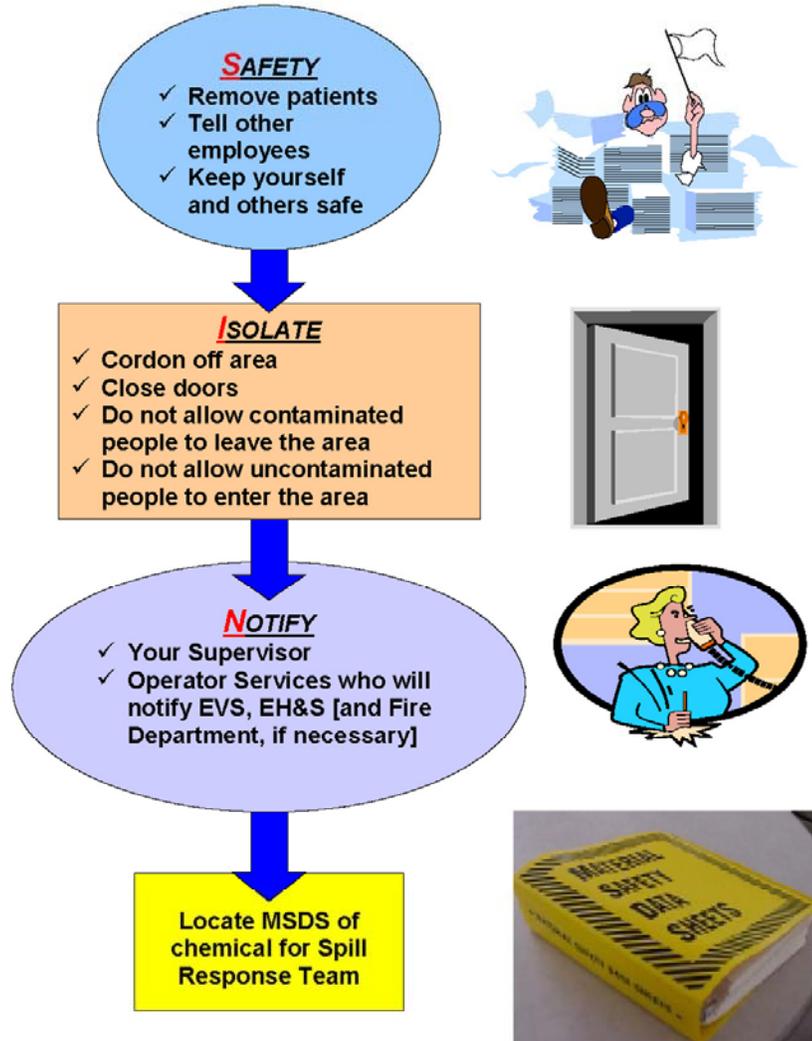
2. Cite four “Mandatory Notifications” required of the responsible party at a Haz Mat event, and indicate at least three other additional notifications required because of the specific Haz Mat incident.

TRASH BAG DECON

CONTENTS:

- Armband for patient (pre-numbered) – tape to the outside of the bags or near the inside top.
- Zip-lock bag gallon sized, (pre-numbered) for valuables (i.e. watch, keys. Jewelry, wallet) – Have the patient keep glasses on, may need to keep hearing aid also.
- Large zip-lock bag (at least 24” X 24”, pre-numbered) for clothing.
- Another zip-lock bag (24” X 30”, pre-numbered) to place all these items in
This will be used to double-bag the clothes and valuables.
- Black lawn type trash bag (at least 60 gallon, larger the better, 2.0 mil thick)
Cut a hole in the top big enough for a head and armholes in the sides.
This will be used for patients to use as a covering if no other shelter is available.
They can disrobe under the bag and rinse under it.
- Each kit should be pre-numbered with the same number, for tracking purposes.
-
- Optional: Can include a Tyvek type covering to change into, or a patient gown

General Chemical Spill Procedures



DIRECTED SELF-DECON GUIDE

Mission: Direct ambulatory patients in the process of their self-decontamination.

Date: _____	Start: _____	End: _____	Position Assigned to: _____	Initial: _____
Position Reports to: Victim Decon Unit Leader Signature: _____				
Hospital Command Center (HCC) Location: _____			Telephone: _____	
Fax: _____		Other Contact Info: _____		Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Recognize the need for decontamination of a presenting patient.		
Be aware of possible hazardous materials exposure to yourself or others.		
Isolate the patient from other patients and staff.		
Make appropriate notifications to ensure others know of the situation.		
Do not touch patient.		
Identify the substance on the patient if possible.		
Ensure you are protected by the use of full Standard Precautions and maintain a sufficient distance between you and the victim.		
Ensure the patient can understand and follow directions. (No visual, hearing, or language challenges) [If challenged – activate the Decontamination Team and await their arrival and set-up maintaining isolation of the patient and the immediate area]		
Lead the patient to a predesignated self-decontamination area.		
Use the shortest path possible to reach the area – retrace the patient’s path to you if possible.		
Instruct the patient to stand in the designated area.		
Take a position near the patient but without the possibility of being touched by the patient or any water spray.		
Maintain security of the area by excluding all other personnel.		
Maintain the privacy of the patient with the use of visual barriers or the use of a Trash Bag style decon kit.		
Make use of chair device to assist patient in disrobing.		
Instruct the patient to remove all personal items, including jewelry, and place them in a sealable bag that can be identified as the patient’s.		
Instruct the patient to remove clothing without pulling anything over their head.		
Instruct patient to place clothing in larger sealable bag that can be identified as patient’s.		
Ensure patient is completely disrobed and all personal items are removed.		
Respect gender differences and remain conscious of inappropriate remarks or actions.		

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Verbally guide patient to begin the process of washing thoroughly with tepid water and soap.		
Observe patient for any signs of stress or physical conditions that may interfere with complete decontamination.		
If you must physically assist patient - communicate this to your supervisor and ensure Decon Team is activated and responds. (Directed Self-Decon is suspended)		
Ensure patient is completely cleaned of any contaminant and is dried and redressed.		
Escort patient to medical triage area.		

Intermediate (Operational Period 1-2 Hours)	Time	Initial
Ensure your own medical monitoring is conducted, if necessary, and coordinate with the Employee Health & Well-Being Unit Leader.		
Advise Victim Decon Unit Leader of any operational issue you are not able to correct or resolve.		

Demobilization/System Recovery	Time	Initial
Ensure decontamination equipment that you used is cleaned, repaired, and replaced as warranted.		
Ensure disposable materials and wastes that you used or created are properly managed.		
Debrief with staff on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure you contribute to all documentation and Operational Logs (HICS Form 214) with the Victim Decon Unit Leader as appropriate.		
<ul style="list-style-type: none"> • Submit comments to the Victim Decon Unit Leader for discussion and possible inclusion in the after-action report; topics may include: • Review of pertinent position descriptions and operational checklists • Recommendations for procedure changes • Section accomplishments and issues 		
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan - reviewed • Hospital patient decontamination plan - reviewed (e.g., decontamination area drawings, procedures, and documentation logs) • Sufficient Self-Decontamination kits for one for each patient anticipated • Universal Precautions for yourself • Communication device if available

Decontamination Process

- I. Identification of Event
 - a. Recognition of Contaminated Patient
 - b. Identify Contaminated areas
 - c. Establish Control Zones
- II. Activation of Response Plan
 - a. Facility Notification
 - b. Job Assignments
 - c. External notifications
- III. Determine need for Decontamination
 - a. Who
- IV. Action Plan development
 - a. Within Facilities Capabilities?
 - b. Decon site
 - c. Flow
 - d. Procedure
 - e. Selection of PPE
 - f. Pre-entry monitoring of Decon Resource Team
 - g. Equipment set up
 - h. Safety considerations
- V. General Decontamination process
 - a. Patient remove valuables
 - b. Remove clothing
 - c. Rinse
 - 1. Start at head and move down
 - d. Soap wash
 - 1. Gentle washing
 - 2. Best to use sponges or soft brushes
 - 3. Start at head and move down, remember nooks and crannies
 - 4. Move to next step if possible (next kiddie pool)
 - 5. Wash bottom of foot, step into next area without putting foot in “dirty water”. Repeat with other foot.
 - e. Rinse
 - 1. Lots of water
 - 2. Start at head and move down
 - 3. Rinse bottom of foot, step into next area without putting foot in “dirty water”. Repeat with other foot.
 - f. Dry
 - g. Clean Covering
- VI. Decontamination Re-evaluation
 - a. Need for further triage?
- VII. Medical Triage

VIII. Termination Process

- a. Decon the Decon Resource Team
 1. Start with most potentially contaminated.
 2. Same decon process as patients, except doing with suit on.
- b. Post monitoring of Decon Resource Team
- c. Containment of PPE
- d. Containment of expendable equipment
- e. Containment of collected runoff
- f. Containment of durable equipment that will need decontaminated
- g. Maintain security on all items until properly disposed of.
- h. Debrief/evaluation of process
- i. Complete documentation

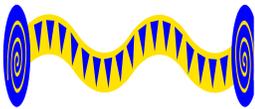
Participant Manual: Chapter 4 Command and Scene Management

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter covers Command and Scene Management with emphasis on the Hospital Incident Command System (HICS). It covers basic principles, organization, implementation and information flow.



Time	Instructor/Participant Ratio	Method of Instruction
1 hour	1/30	Facilitated Seminar



Terminal Objective

Participants will be able to identify the purpose and need to safely initiate command and explain the purpose, need and benefits of scene management.



Enabling Objectives

1. Demonstrate proper information flow from first receivers to the Incident Commander.
2. Describe basic implementation of HICS to manage a Hazmat Event, both internal and external.
3. Describe healthcare worker roles under HICS

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResB1a 1	Develop plans, policies, procedures and systems for on-site incident management
ResB1a 3.2	Implement command staff functions
ResB1a 5.1.2	Establish the command and general positions needed to manage the incident and meet incident objectives
ResB1a 5.1.3	Establish branches, groups and divisions needed to manage the incident and meet incident objectives, strategies and tactics



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)



Supporting Materials

- Participant Manual

Activities

- Easel charts for brainstorming

**An Operations Level Program
for Managing Hazardous
Materials Emergencies Within
Healthcare**

Slide 4.1

These next chapters make up the remainder of the First Receiver Operations Training.

**Command, Introduction to Scene
Management**



Slide 4.2

I. Remember in the Awareness class we introduced this mnemonic device to remember how to address a Haz Mat incident in an organized and thorough manner.

II. S - Safety
 I - Isolate and Deny Entry
 N - Notifications

III. In the Operations Level course we will cover the rest of the mnemonic.

In this class we will cover: C I A P C P D D D

- C - Command / Management
- I - Identification and Hazard Assessment
- A - Action Planning
- P - Protective Equipment
- C - Containment, Control and Cleanup
- P - Protective Actions
- D - Decontamination
- D - Disposal
- D - Documentation

Main Points

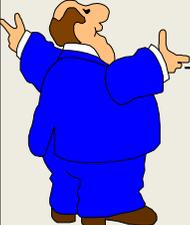
- Scene Management System
- Common Scene Management Systems
- ICS's General Premise & Basic Principles
- Hazmat and "Who's In Charge"

Slide 4.3

Scene management main points.

Need Good Scene Mgt System

- Purpose of Scene Management
 - Provide workable system in hospital setting
 - Efficiently/effectively use resources
 - Minimize impacts of incident on rest of facility



Slide 4.4

Why we need to have good scene management.

Incident Command System

- The required command system
 - CCR 5192: use "the ICS"
 - CGC 8607: must use ICS in the field



Slide 4.5

Managing an event effectively from the beginning of the evolution is key to the safety of all involved.

Benefits of ICS

- Hospitals use a modified system called HICS
- More efficient use of resources
- More effective management
- Safer response



Slide 4.6

Fire and Law also use the Incident Command System.

At hospitals we have the Hospital Incident Command System (HICS)

HICS is used for all emergency events, not just HazMat. Hospitals that have not adopted HICS as their organizational structure for managing emergencies are encouraged to do so.

Haz Mat & “Who’s In Charge”

- Haz Mat requires establishing Command early, but...
- Common Haz Mat deficiency is poor management (i.e. Command)!
 - Early assumption of Command reduces chaos and aids in management

Slide 4.7

Some one has to be in charge.

With HazMat situations, someone who is familiar with HazMat emergencies needs to be in charge of the response.

Activating the emergency protocols early will increase the potential for a safe and effective response.

Recognizing that an event may be beyond the capabilities of the normal activities of a department/facility is often contrary to human nature wanting to be able to handle the situation. Recognizing that a hazardous materials incident is an extraordinary event and responding appropriately is not a sign of weakness.

In a healthcare setting, someone from the hospital should be within the Unified Command if outside responders are participating in the event (e.g., fire).

**Need a good
Scene Management System**

Goal: Protect

- Life
- Environment
- Property

Need *one* system for all responders



Slide 4.8

The priority of protection - is to protect Life first, then Environment, and lastly Property.

Need one system so everyone is talking the same language. Inside and outside the hospital.

An incident command system is a requirement of JCAHO Emergency Management standard 1.4, the HAZWOPER Standard, and Homeland Security Presidential Directive #5 mandates that all Federal agencies use ICS and encourage other organizations to do so also.

HICS Organization

- Command/IC (overall management)
 - Planning/Intel (does incident action planning)
 - Operations (manages tactical operations)
 - Logistics (procures incident resource needs)
 - Finance/Admin (manages financial aspects)

Slide 4.9

Using HICS really does make response easier. This is especially true since a hazmat incident will bring many players from many organizations and disciplines. Without a common system and nomenclature (language) the incident can become a Tower of Babel or more illustrative expressions.

Review of HICS

5 main components:

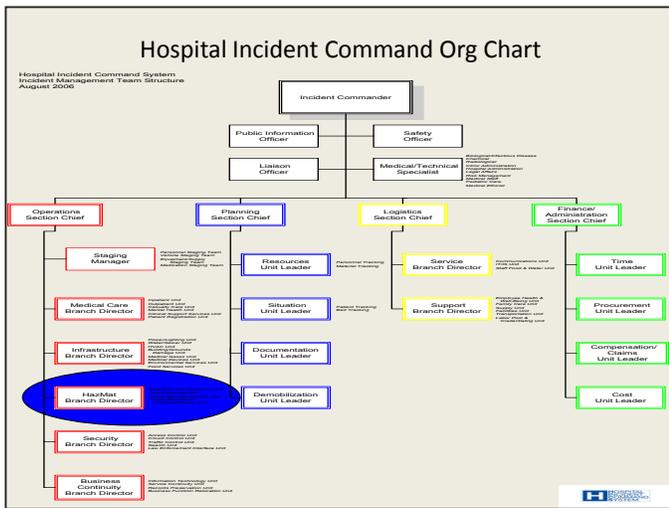
Command is in charge and makes the final decisions

Planning figures out what is going on and makes suggestions on what to do

Operations gets the job done

Logistics provides the tools to get the job done

Finance pays for everything (we hope)



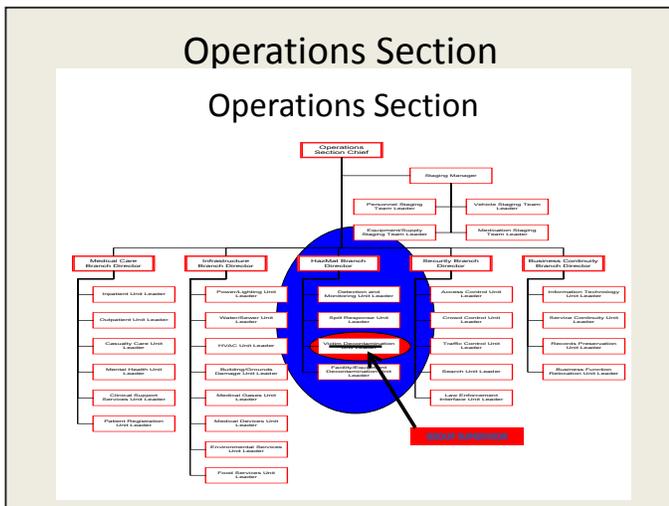
Slide 4.10

This is the HICS org chart. There are some subtle differences between HICS and Firescope ICS.

Note that HAZMAT falls under Operations and is now considered a Branch rather than a Group

Technical Specialists are now part of command staff.

See Chart on Page 4.18



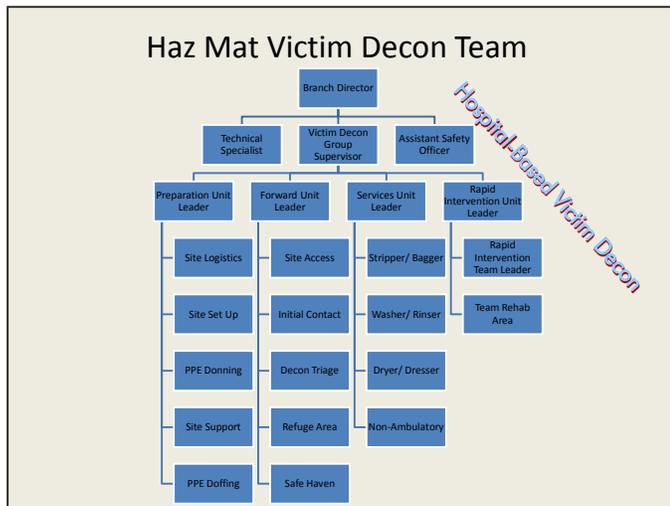
Slide 4.11

Under HICS the HAZMAT Branch is further subdivided into Units. For the most part this course focuses on the Victim Decontamination Unit and to a lesser degree the Spill Response Unit, since at the FRO level spill response is “defensive.”

Groups are established to divide the incident management structure into functional areas of operation. They are composed of resources that

have been assembled to perform a special function not necessarily within a single geographic division. A Supervisor leads a Group.

Units are organizational elements that have functional responsibility for a specific incident planning, operations, logistics, or finance/administration activity (e.g., Inpatient Unit, Situation Unit, Supply Unit).



Slide 4.12 - 4.13

Hospitals often only perform the Decon component. This response may be a stand-alone activity (decontaminating staff, patients, contaminated victims from external to the hospital) or as part of an integrated response with an internal hazardous materials team, fire department (or other public safety organization), or clean-up contractor.

Thus the Victim Decon Team. (Note: a HAZMAT team is considered one of the groups that requires being enrolled in a medical surveillance program. A Decon Resource team is not technically a HAZMAT team.)



Discuss roles of these sections:

- Victim Decon Team Leader
- Safety Officer
- Site Access Control
- Set Up / Support
- Initial Contact
- Triage
- Stripper / Bagger
- Washer / Rinser
- Dryer / Dresser

Slide 4.14 - 4.15

Job Action Sheets

- Guidance for each position with:
 - Basic information
 - Mission
 - Tasks (immediate, intermediate, long-term)



The positions and Job Action Sheets for the Decon Resource Team were developed by HAZMAT for Healthcare and are not currently an official part of HICS, FIRESCOPE, or NIIMS. These Job Action Sheets are HICS-compatible.

Have the students turn to the Job Action Sheets for the Decon Group Director/Supervisor in their notebook and show them the format as demonstrated on the next slide. On the following slide which is a repeat of the org chart slide you should briefly review the positions with Job Action Sheets and Task Specific sheets.

JOB ACTION SHEET OPERATIONS SECTION
HAZARDOUS MATERIAL BRANCH
VICTIM DECON GROUP SUPERVISOR

Mission: Coordinate the on-site patient decontamination activities related to a hazardous material incident response. Coordinate with Decon Assistant Safety Officer and appropriate Decon Facilities, Decon Forward and Decon Services Unit Leaders.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
 Position Reports to: HazMat Branch Director/Supervisor
 Hospital Command Center (HCC) Location: _____ Telephone: _____
 Fax: _____ Other Contact Info: _____ Radio Type: _____

Immediate (Operational Period 0-2 Hours) (Operational Periods are arbitrary and may vary by incident). Tasks are not in order of execution.

Task	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Hazardous Materials Branch Director.		
Read this entire Job Action Sheet and review incident management team start (HCS Form 202). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Document all key activities, actions, and decisions in an Operational Log (HCS Form 214) or equivalent form.		
Appoint Victim Decontamination Group members.		
Preparation Unit Leader: _____		
Forward Unit Leader: _____		
Services Unit Leader: _____		
Rapid Intervention Leader: _____		
Brief Unit members on current situation, incident objectives and strategy, outline Unit action plan, and designate time for rest/briefing.		
Ensure Unit members comply with safety process and procedures and use appropriate personal protective equipment.		
Oversee the area of decontamination area to perform patient/responder/mandatory behavior, and emergency decontamination for all ambulatory and non-ambulatory patients.		
Ensure medical monitoring of decontamination team members through (TS).		
Ensure collection and security of patient valuables, coordinate with Security Branch Director.		
Ensure timely processing of patients through decontamination corridor. 3:5 minutes for non-ambulatory patient and 5:0 minutes for ambulatory or shower agent.		
Ensure appropriate antibiotic supplies are delivered, coordinate with Clinical Support Services.		
Ensure proper wastewater collection and disposal, in compliance with recommendations.		

JOB ACTION SHEET OPERATIONS SECTION
HAZARDOUS MATERIAL BRANCH
VICTIM DECON GROUP SUPERVISOR

Intermediate (Operational Period 0-2 Hours) (Operational Periods are arbitrary and may vary by incident). Tasks are not in order of execution.

Task	Time	Initial
Meet regularly with the Hazardous Materials Branch Director for status reports, and any pertinent information to Unit Members.		
Ensure staff are trained and replaced as needed.		
Ensure tracking of results of medical monitoring of staff, coordinate with the Employee Health & Well-Being Unit leader.		
Ensure hazard monitoring continues and issues are addressed, coordinate with the Safety Officer.		
Ensure chain of custody of personal valuables, in coordination with the Security Branch Director.		
Ensure decontamination supplies are replaced as needed.		
Prepare for the possibility of evacuation under the direction of the decontamination area. If needed.		
Coordinate status with internal authorities, as appropriate through Hazardous Materials Branch Director and in coordination with the Liaison Officer.		
Identify and submit an action plan to the Hazardous Materials Branch Director when requested.		
Advise Hazardous Materials Branch Director immediately of any operational issue you are unable to control or resolve.		

Demobilization/System Recovery

Task	Time	Initial
As needs for the Group staff decrease, return staff to their usual jobs and continue or structure positions in a phased manner.		
Ensure Victim Decontamination Group members are notified to terminate operations.		
Ensure decontamination equipment is cleaned, repaired, and replaced as warranted.		
Ensure disposable materials and wastes are properly managed.		
Address report of patient exposures with the Security Branch Director, law enforcement, fire department, and hazardous material team.		

Slide 4.16

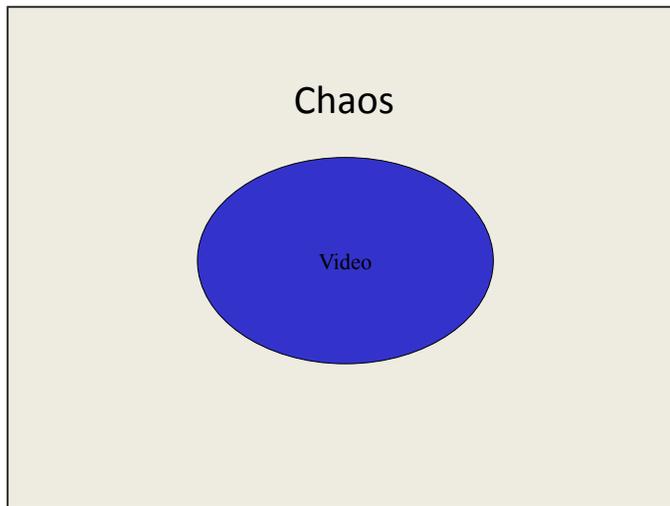
DECON STRIPPER/BAGGER TASK LIST

Mission: Disrobe victims in preparation for decontamination while securing and tracking their physical possessions.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
 Position Reports to: Decon Services Unit Leader

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE and appropriate unique identifier.
Level C is usually the initial ensemble.
Review communication methods being used by Services Unit Leader.
Establish and maintain visual/verbal contact with: Initial Contact and Washer/Rinser positions.
Assume position inside Contamination Reduction Corridor in patient, clothing doffing area.
Ensure your area has sufficient doffing materials for the number of patients expected.
Ensure your area is prepared with seating for patients when they disrobe.
Call for a patient to be sent to you indicating gender if appropriate.
Verbally guide patient to remove all personal items from clothing and body, including jewelry, and place in smaller labeled bag - physically assist only if necessary.
Guide patient in removing all clothing and place in larger labeled doffing bag - physically assist only if necessary.
Send patient into washing area when called for by Washer/Rinser.
Secure all of the patient's personal effects bags in predetermined location.
Prepare your area for the reception of the next patient.
Call for the next patient.
May assist Washer/Rinser if census allows.
In the event of PPE failure or personal distress, notify buddy and Decon Services Unit Leader. PROCEED THROUGH DECON and seek assistance.
Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Services Unit leader.
Report through Contamination Reduction Corridor and ensure effective personal decon.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

This is an example of the Task List form that is used for specific decontamination team assignments.



Slide 4.17

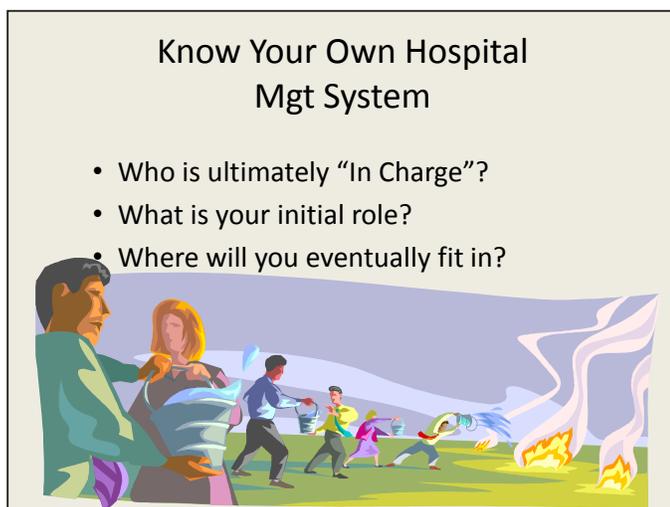
Set up video of contaminated patients coming into emergency room.



Slide 4.18

Video of Chaos occurring in a hospital emergency room

Discuss the vignette and how the presence or lack of an incident command system impacted the response.



Slide 4.19

Summary of chapter. Know your hospital plan, who’s in charge and your role in the hospital system.

Liken the IC (Incident Commander) to a “Code Team Leader.” It is the IC’s job to “Successfully resuscitate” the situation.

Supporting Material

Command and Introduction to Scene Management: (C.)

Main Points

- Scene Management System
- Common Scene Management Systems
- ICS's General Premise and Basic Principles
- Haz Mat and "Who's In Charge"
- ICS Organization
- HICS/Hospital Emergency Incident Command System
- Implementing and Expanding ICS
- Information Flow & the Incident Command Post
- Know the Incident Command System!!

Block Outline

1. Haz Mat Requires a Good Scene Management System.
 - a. Purpose of scene management: provide one workable “System” for all receivers to use, to make the most efficient and effective use of all resources, to minimize impacts of the incident.
 - b. Goal: Intervene and better protect life, environment and property.
 - c. Need organization/management system for all receivers working together as one system to support common goal.
 - d. In Haz Mat, the Incident Command System (ICS) is the required scene management system to use.
 - 1) ICS is an organized system of roles, responsibilities and S.O.P.s used to manage and direct emergency operations.
 - 2) CCR 5192(q)(3) requires the use of “the” ICS as the command system for Haz Mat events. (Note: 29 CFR 1910.120 requires the use of “a site-specific Incident Command System.”)
 - 3) CGC 8607, also known as the “Standardized Emergency Management System” (SEMS), mandates the use of ICS in any field emergency involving two or more agencies.

Requirements for using ICS

California Government Code Section 8607

SEMS “By December 1, 1993, the Office of Emergency Services...shall jointly establish by regulation a standardized emergency management system for use by all emergency response agencies... This system shall be applicable, but not limited to, those emergencies or disasters referenced in the state emergency plan. ...state agencies shall use the standardized emergency management system...to coordinate multiple- jurisdiction or multiple-agency emergency and disaster operations. ...each local agency...shall use the standardized emergency management system...to coordinate multiple-jurisdiction or multiple- agency operations.”

29 CFR 1910.120(q)(3)(i)

Fed OSHA “The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders/receivers and their communications shall be coordinated and controlled through the individual in charge of the ICS, assisted by the senior official present for each employer.”

Title 8 CCR Section 5192(q)(3)(A)

State OSHA “The senior emergency response official who has ultimate site control responsibility shall confirm that the Incident Command System (ICS) is in place and the position of Incident Commander (IC) instituted. All emergency responders/receivers and their communications shall be coordinated and controlled through the ICS.”

2. Common Scene Management Systems
 - a. Many systems used (e.g. ICS, IMS, agency models, etc.).
 - b. For this class, we will use the Hospital Emergency Incident Command System (HEICS):
 - 1) Organized system to manage and direct emergency operations.
 - 2) Purpose: Provide predetermined and standard organization.
 - c. Benefits: Many, but primarily for an efficient and effective scene management “System” for multi-agency incidents like a hazmat.
 - d. “System” defined: Interacting, interrelated or interdependent elements forming a collective entity—with a common goal.

3. ICS’s General Premise and Basic Principles.
 - a. Customized organization and management tool to help — If users understand and agree to “Incident Operating Procedures,” “Common Terminology” & “Structural Organization.”
 - b. Review of “ICS Operational Systems Descriptions” (ICS 120-1).
 - c. ICS is a scene management “tool chest.”

Principles of ICS

Definitions

Definitions of a System:

- A group of interacting, interrelated or interdependent elements forming, or regarded as forming, a collective entity.
- A functionally related group of elements, as: the human body regarded as a functional physiological unit.
- A social, economic or political organizational form.
- The state or condition of harmonious, orderly interaction.

Requirements

The following are basic system design operating requirements:

Provides for the following kinds of operations: single jurisdiction/single party, single jurisdiction with multi-party involvement and multi-jurisdiction/multi-party involvement.

Organizational structure must be able to adapt to any incident.

Applicable and acceptable to all users.

Readily adaptable to new technology.

Able to expand in a logical manner from an initial emergency into a major incident.

Have basic common elements in organization, terminology and procedures.

Implementation should have the least possible disruption to existing systems.

Effective in fulfilling all of the above requirements and simple enough to ensure low operational costs.

4. Haz Mat and “Who’s In Charge.”

- a. Haz Mat events require establishing Command early, but a common deficiency is poor management (i.e. Command!)
 - 1) Assume Command early to reduce chaos and aid management.
- b. 29 CFR 1910.120 and Title 8 CCR 5192 mandate an “IC.”
- c. CVC 2454 designates “Incident Command Authority” for “On-Highway/Road” Haz Mat events to be the law enforcement agency with primary traffic investigative authority where the spill occurs (state highway or county road: CHP, city street: Police Department).
- d. Use concept of IC in “Single” or “Unified” Command:
 - 1) Can use Single Command IC with many deputies in hazmat, or Unified Command when multi-jurisdictional or when multi-agencies have vested interests in event management.
- e. The first arriving FRO can help “command” by doing this:
 - 1) Assume “Temporary Command” formally.
 - 2) Set up a “Temporary Command Post” where you are.
 - 3) Manage event until the designated IC arrives for briefing.

5. ICS Organization

- a. Critical components of a good organization:
 - 1) One unified organization,
 - 2) Clear functional elements (division of labor),
 - 3) Flexibility and expandability,
 - 4) Unity of command (with good supporting chain of command),
 - 5) Manageable span of control,
 - 6) Effective communications and coordination.
 - 7) Other: _____

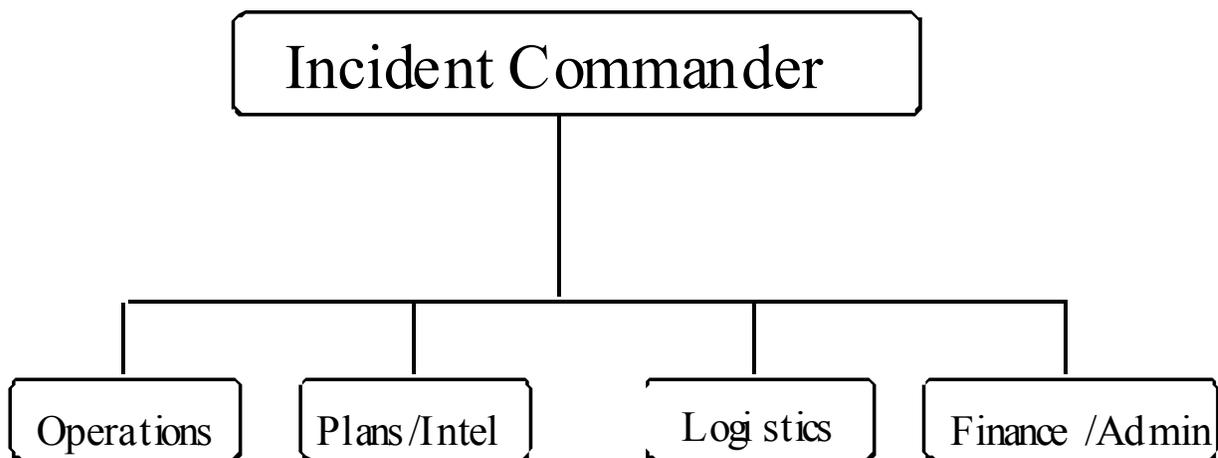
- b. Major ICS Sections (and functions):
 - 1) Command/IC (overall management),
 - 2) Operations Section (manages tactical operations),
 - 3) Planning/Intel Section (does incident action planning),
 - 4) Logistics Section (procures incident resource needs),
 - 5) Finance/Admin Section (manages incident financial aspects).

- c. Know role of Command and General Staff positions.

- d. Typical functional “Groups” within Operations.
 - 1) Haz Mat Group.
 - 2) Security Group.
 - 3) Medical Group.
 - 4) Protective Action Group.
 - 5) Containment Group.

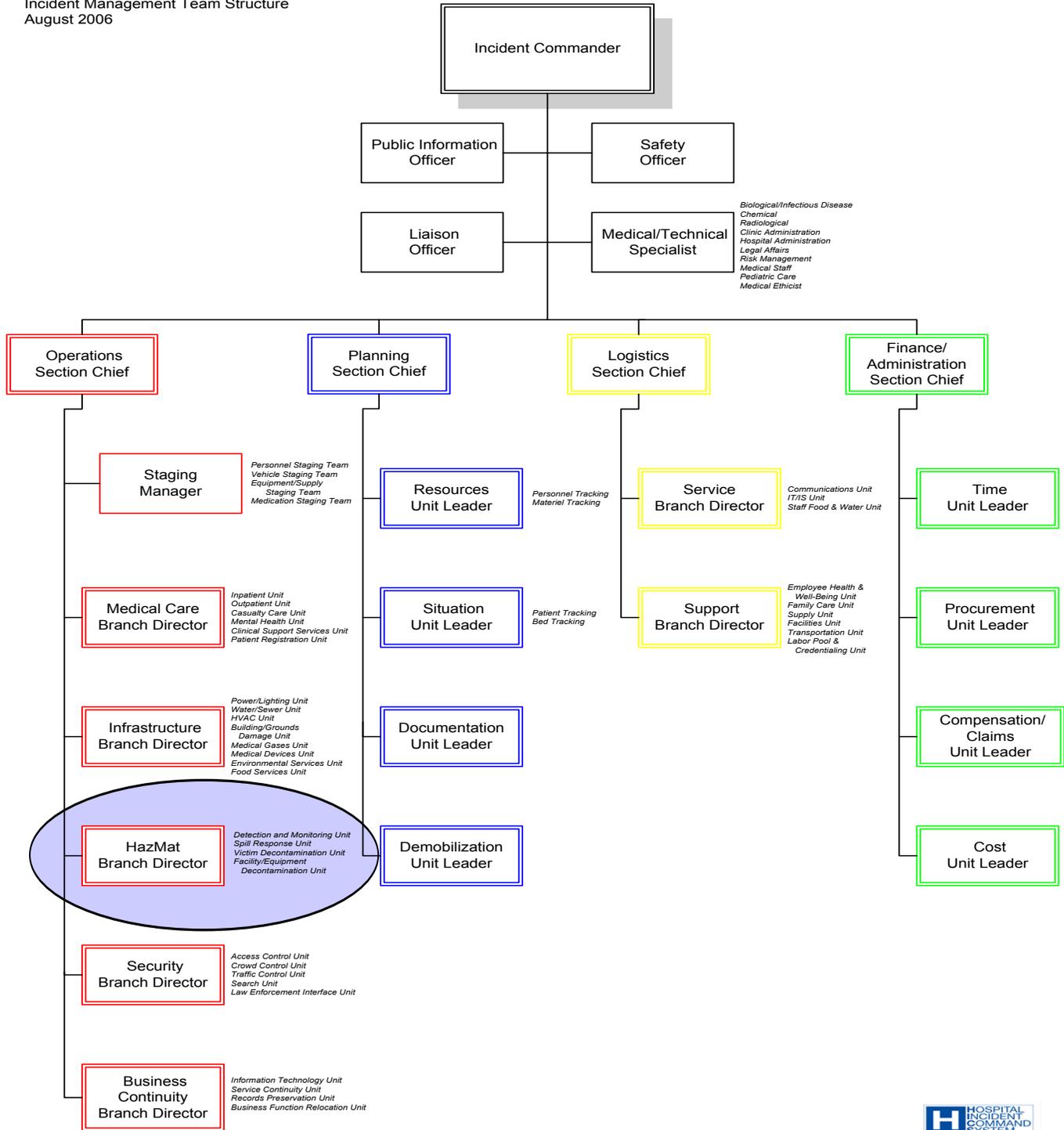
- e. Know where the FRO may best fit into the organization (any position that he/she can function in and is trained to—usually, in a defensive role, within Operations.)

HICS General Staff



HICS General Staff

Hospital Incident Command System
Incident Management Team Structure
August 2006



6. Know the Incident Command System!!!
 - a. Who is ultimately “In Charge” of the System?
 - b. What is your initial role in the System regarding Command?
 - c. Where will you eventually fit into the overall System?
 - d. Who do you report to and communicate with in the System?
 - e. Do you have a basic understanding of the System so that you can function in a safe and competent manner at Haz Mat events?

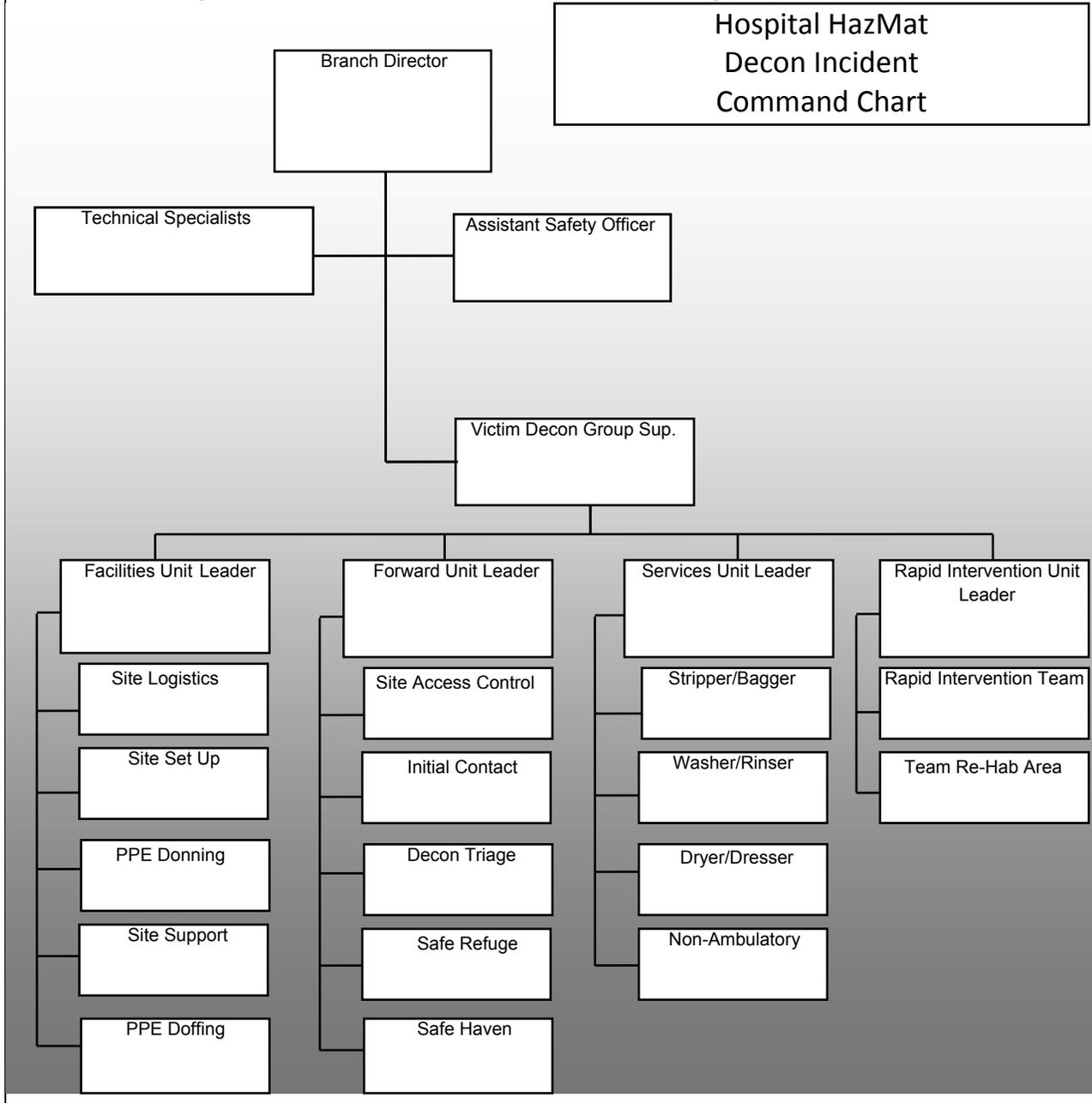
Hospital Hazardous Materials Site Safety and Control Plan - Annex

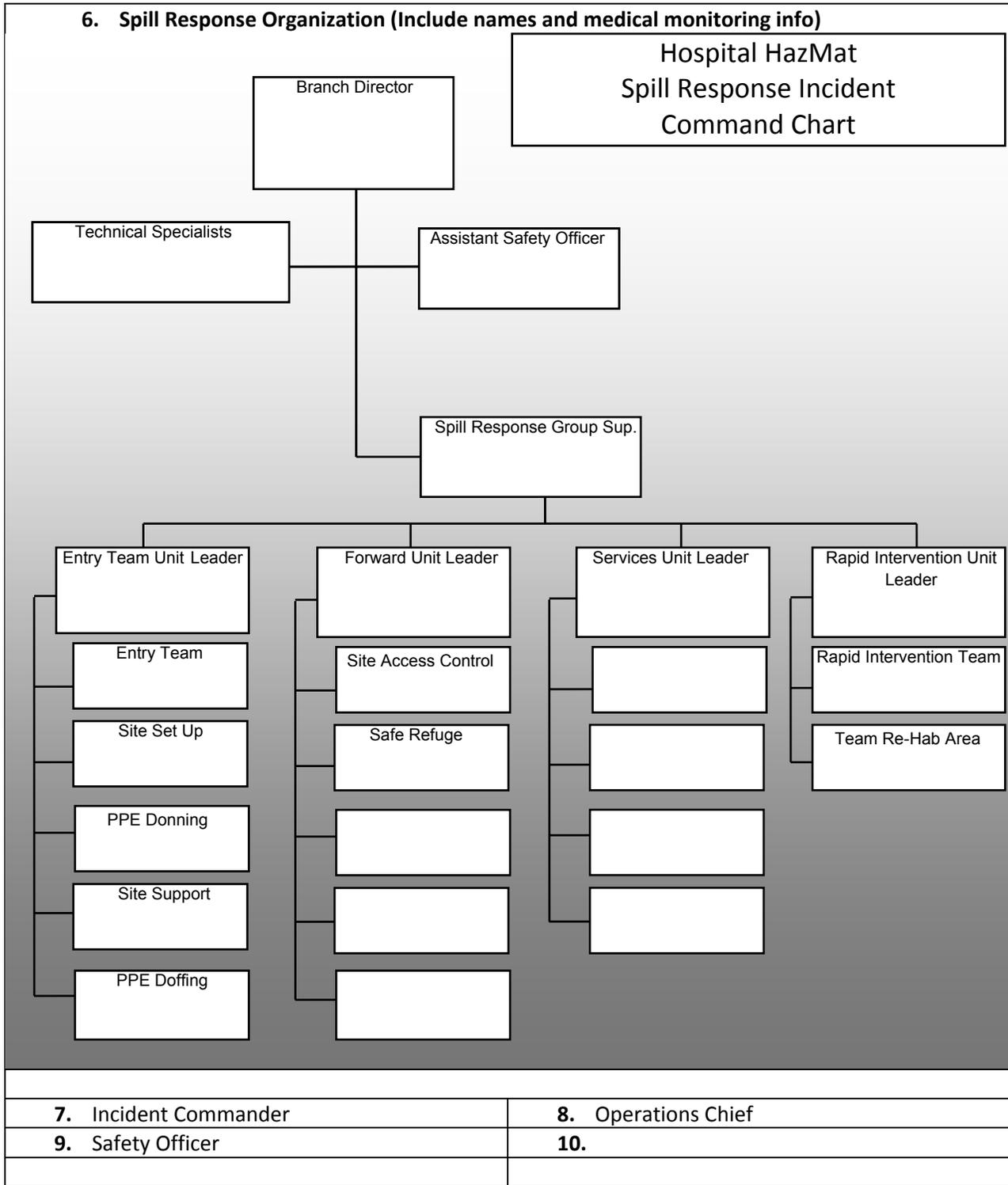
(To be used with and attached to IAP and Hazardous Materials Site Safety and Control Plan and HARM Worksheet)

1. Incident Name:	2. Date Prepared:	3. Operational Period: Time:
-------------------	-------------------	---------------------------------

<input type="checkbox"/> Decon	<input type="checkbox"/> Spill Response	<input type="checkbox"/> Both
4. Site Access Issues? (including weather)		

5. Decon Organization (Include names and medical monitoring info)





11. Hazard Monitoring (type and readings)		
Oxygen	Flammability (LEL)	Toxicity
Radiological	Other	Other

12. Communications			
Tactical Frequency	Decon	Spill Response	Command Frequency
○ Hand Signals Reviewed		Whiteboard	
Loud Hailer (bull horn)		Other	

13. Decontamination Objectives			
14. Spill Response Objectives			
15. Type of Decon	○ Precautionary/Secondary/Patient	○ Emergency	○ Technical
16. Type of Spill Response	○ Offensive (Tech/Spec)	○ Contain/Control (Ops)	○ SIN (Awareness)
17. Victim Decon Guidelines and Work Practices and Special/Safety Instructions (include maximum time in suit based on heat stress guidelines, chemical specific hazards and warning signs, decon solutions if other than soap and tepid water)			
18. Response Guidelines and Work Practices and Special/Safety Instructions (include maximum time in suit based on heat stress guidelines, chemical specific hazards and warning signs, tools needed, Responder Decon Guidelines if different than above)			

19. Personal Protective Equipment (PAPR w/Multigas Cartridge, Liquid Splash Suit, Double gloves, Boots) Note if different					
Respiratory Protection	None	APR	PAPR	SAR	SCBA
Initial Contact/ Decon Triage/ Safe Refuge			Dryer-Dresser/Safe Haven (may be Standard Precautions)		
Stripper-Bagger/Washer-Rinser/ Non-Ambulatory			Site Access		
Rapid Intervention			Entry Team		

20. Emergency Procedures	Victim Decon	Spill Response
Injury/Illness in Zones		
Fire/Explosion		
PPE Failure		
Emergency Evacuation Route and Congregation Area		

21. Victim Decon Site Map
22. Spill Response Site Map

23. Safety Briefing Completed: Time	24. By Whom:
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Participant Manual: Chapter 5

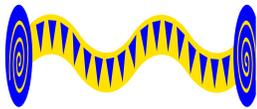
Identification and Hazard Assessment, Action Plans

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter describes identification and hazards assessment techniques, and demonstrates the use of a variety of Technical Reference sources including the Department of Transportation “Emergency Response Guidebook”.



Time	Instructor/Participant Ratio	Method of Instruction
1.5 hours	1/30	Facilitated Seminar



Terminal Objective

At the end of this chapter participants will describe the use of several technical resources and develop action plans to aid in the response to internal and external incidents in a healthcare environment.



Enabling Objectives

This chapters enabling (performance) objectives are to ensure participants will be able to:

1. Describe identification and hazard assessment techniques
2. Demonstrate use of the DOT Emergency Response Guidebook to initiate basic action planning.
3. Demonstrate the use of the Hazard and Risk Management (HARM) Worksheet
4. Demonstrate the use of the Site Safety Plan

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResA1a 5	Identify extent and potential nature of incident
ResB1a 3.2.3.1	Develop information regarding incident
ResB1a 1	Develop plans, policies, procedures and systems for on-site incident management
ResB1b 1.1.1	Develop procedures to identify and assess hazards



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)

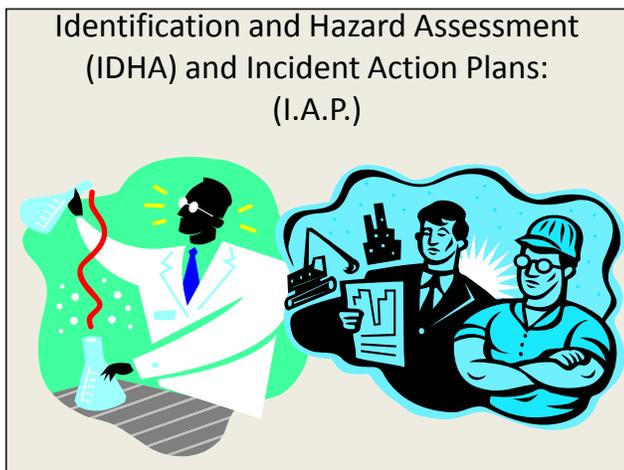


Supporting Materials

- Emergency Response Guidebook
- Participant Guide (1 for each participant)

Activities

- Emergency Response Guidebook Worksheet



Slide 5.1

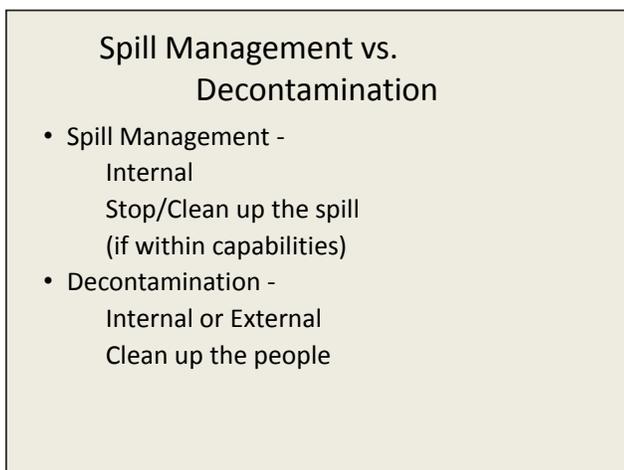
Liken an Incident Action Plan (IAP) to a “Patient Car Plan”

IDHA = Identification and Hazard Assessment

You need to know what you are working with and the hazards involved.

Must have an Action Plan. Shouldn't just be jumping in.

Note: Most organizations do not develop Incident Action Plans or develop them poorly.

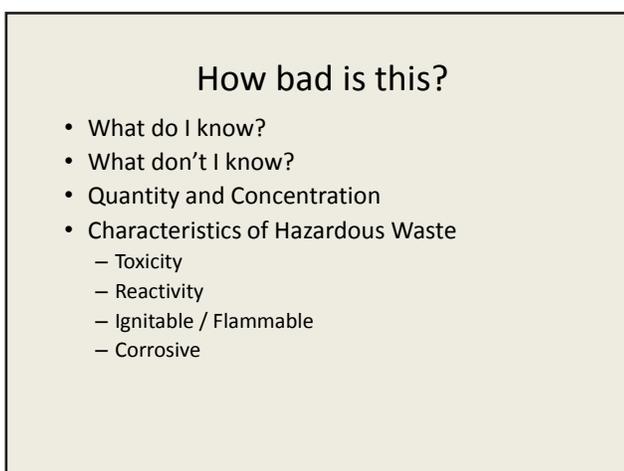


Slide 5.2

Are you dealing with an Internal Spill? Decontamination of people? Or both?

If the spill is not within your capabilities and resources, you shouldn't be dealing with it. Request outside resources.

Decon may be of people contaminated by an Internal Spill or of people contaminated by an External event outside the hospital.



Slide 5.3

These are some of the criteria to determine a “go-no go” situation and helps to determine the type and level of response. A revisit to material in the Awareness section.

How bad is this?



- Spill Area (surface area)
- Ventilation
- Population at risk to exposure
- Environment at risk

Slide 5.4

Spill Area- Discuss how the spread of a liquid increases surface area and subsequently increase airborne vapor concentration of contaminant.

Ventilation- Discuss air exchanges, shutting down or increasing HVAC.

Population at Risk- Patients (ambulatory, non ambulatory), staff, Community surrounding hospital

Environment at Risk- Plume direction, waterways

For example, a spill in a Medical Office Building at 5 PM on a Friday afternoon is of less concern than a release in the substerile area of a busy operating room complex.

Info Sources to Aid Identification and Hazard Assessment (IDHA)

- Markings and Colors
- Placards and labels
- S.D.S.
- ERG (Emergency Response Guidebook)
- Reference guides
- Technical information centers
- People

Slide 5.5

Markings - UN #'s

Placards - as we discussed in the FRA class

SDS's - as discussed in the FRA class

ERG - see slides

Reference guides - such as the NIOSH pocket guide and the ATSDR- Agency for Toxic Substances & Disease Registry

Technical information - such as Chemtrec, reiterate the benefits of Poison Control Centers

People - see next slide

Info Sources to Aid IDHA



- People
 - Facility manager/employee
 - Victim
 - Witnesses

Slide 5.6

Often eye witnesses are not the most reliable resource. Use them as appropriate.

Info Sources

Emergency Response Guidebook (ERG)



- ERG purpose:
 - Basic safety tool
 - Basic identification
 - Initial actions

Slide 5.7

The DOT Emergency Response Guidebook is one of the basic tools in hazardous materials response. Although designed for highway spills, its ease of use and quick reference guides may be of value in any hazmat incident

Info Sources
ERG Organization

- **White** — Basic info & instructions
- **Yellow** — UN #, guide # & material name
- **Blue** — Material name, guide # & UN #
- **Orange** — Chemical information
- **Green** — Isolation & Protective Actions

Slide 5.8

General information on placards and shapes of transportation tanks in front Sections,

White pages - basic info

Yellow pages - Placard ID #, the guide number, and the material name

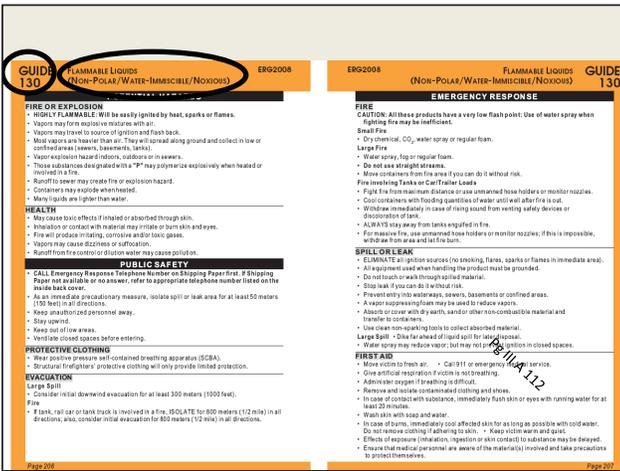
Blue - lists the index information in alphabetical order

Orange - gives the information about the chemicals. (Greatest hazards listed first.)

Fire and Health hazards
First Aid
PPE needed

Green - give isolation, evacuation and protective actions information for items highlighted in the blue and yellow sections.

ID No.	Guide No.	Name of Material	ID No.	Guide No.	Name of Material	Name of Material	Guide ID No.	Name of Material	Guide ID No.
1287	127	Rubber solution	1314	133	Calcium resinates, fused	Vinyl bromide, stabilized	116P 1005	White asbestos	171 2550
1288	128	Shale oil	1318	133	Cobalt resinates, precipitated	Vinyl butyrate, stabilized	128P 2038	White phosphorus, dry	136 1361
1289	132	Sodium methyle, solution in alcohol	1320	113	Dinitrophenols, wetted with not less than 15% water	Vinyl chloride, stabilized	116P 1086	White phosphorus, in solution	136 1361
1292	139	Ethyl silicate	1321	113	Dinitrophenolates, wetted with not less than 15% water	Vinyl chloroacrolein	155 2069	White phosphorus, molten	136 2467
1292	129	Tetraethyl silicate	1322	113	Dinitrophenolates, wetted with not less than 10% water	Vinyl ethyl ether, stabilized	127P 1302	White phosphorus, under water	136 1361
1293	127	Tincture, medicinal	1324	133	Fluorant	Vinyl fluoride, stabilized	116P 1060	Wood preservatives, liquid	129 1306
1294	130	Toluene	1325	133	Flammable solid, n.o.s.	Vinylidene chloride, stabilized	126P 1023	Wood waste, wet	123 1387
1295	139	Trichloroethylene	1323	176	Fluorant	Vinyl isobutyl ether, stabilized	127P 1304	Xanthates	135 3342
1296	132	Trinitroamine	1324	133	Film, nitrocellulose base	Vinyl methyl ether, stabilized	116P 1087	Xenon	121 2036
1297	132	Trinitroethylene, aqueous solution	1325	133	Flammable solid, n.o.s.	Vinylidene, stabilized	151P 3073	Xenon, compressed	191 2036
1298	145	Trinitrophenol	1325	133	Flammable solid, organic, n.o.s.	Vinylbenzene, stabilized	126P 1011	Xylenes, o-cresol	136 1361
1299	128	Turpentine	1325	133	Fuses (rail or highway)	Vinyltoluene, stabilized	116P 1011	Xylenes, m-cresol	136 1361
1300	128	Turpentine substitute	1326	176	Hydrazine powder, wetted with not less than 25% water	Water-reactive liquid, corrosive, n.o.s.	133 3129	Xylenes, p-cresol	136 1361
1301	129P	Vinyl acetate, stabilized	1327	133	Shale, wet, damp or contaminated with oil	Water-reactive liquid, n.o.s.	138 3148	Xylenes, o-cresol	135 2261
1302	127P	Vinyl ether, stabilized	1327	133	Shale, wet, damp or contaminated with oil	Water-reactive liquid, n.o.s.	130 3130	Xylenes, m-cresol	135 2261
1303	130P	Vinylidene chloride, stabilized	1327	133	Shale, wet, damp or contaminated with oil	Water-reactive liquid, toxic, n.o.s.	133 3130	Xylenes, p-cresol	135 2261
1304	127P	Vinyl isobutyl ether, stabilized	1327	133	Shale, wet, damp or contaminated with oil	Water-reactive solid, corrosive, n.o.s.	138 3151	Xylenes, o-cresol	135 2261
1305	139P	Vinyltoluene, stabilized	1328	133	Hexamethylenetetramine	Water-reactive solid, flammable, n.o.s.	138 3152	Xylenes, m-cresol	135 2261
1306	129	Wood preservatives, liquid	1328	133	Hexamine	Water-reactive solid, n.o.s.	138 2813	Xylenes, p-cresol	135 2261
1307	139	Xylenes	1329	133	Hexamine	Water-reactive solid, oxidizing, n.o.s.	138 3153	Xylenes, o-cresol	135 2261
1308	176	Zincium metal, liquid suspension	1330	133	Manganeses resinates	Water-reactive solid, toxic, n.o.s.	133 3154	Xylenes, m-cresol	135 2261
1309	176	Zincium metal, liquid suspension	1331	133	Matches, "strike anywhere"	Water-reactive solid, n.o.s.	138 2813	Xylenes, p-cresol	135 2261
1310	176	Zincium metal, liquid suspension	1332	133	Metaldolite	Water-reactive solid, oxidizing, n.o.s.	138 3153	Xylenes, o-cresol	135 2261
1311	139	Aluminum powder, coated	1333	176	Carbon, black, light or rook (charcoal)	Water-reactive solid, n.o.s.	133 3154	Xylenes, m-cresol	135 2261
1312	133	Borax	1334	133	Naphthalene, crude	Water-reactive solid, n.o.s.	138 2813	Xylenes, p-cresol	135 2261
1313	133	Calcium resinates	1334	133	Naphthalene, refined	Water-reactive solid, n.o.s.	138 2813	Xylenes, o-cresol	135 2261
			1335	133	Nitroquandine (Picric), wetted with not less than 25% water	Water-reactive solid, n.o.s.	133 3154	Xylenes, m-cresol	135 2261
			1336	133	Nitroquandine, wetted with not less than 25% water	Water-reactive solid, n.o.s.	133 3154	Xylenes, p-cresol	135 2261
						Water-reactive solid, n.o.s.	138 2813	Xylenes, o-cresol	135 2261
						Water-reactive solid, n.o.s.	138 2813	Xylenes, m-cresol	135 2261
						Water-reactive solid, n.o.s.	138 2813	Xylenes, p-cresol	135 2261
						Water-reactive solid, n.o.s.	138 2813	Xylenes, o-cresol	135 2261
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						Water-reactive solid, n.o.s.	138 2813	Xylenes, p-cresol	135 2261
						Water-reactive solid, n.o.s.	138 2813	Xylenes, o-cresol	135 2261
						Water-reactive solid, n.o.s.	138 2813	Xylenes, m-cresol	135 2261
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						Water-reactive solid, n.o.s.	138 2813	Xylenes, p-cresol	135 2261
						Water			



Slide 5.10

The guide pages identify the category of the product (flammable liquid). The potential hazards lists the greatest hazard first- in this case fire or explosion).

Info Sources
ERG—Good But Limited

- Classification of hazard
- Guides — “most essential guidance”
- Isolation/evacuation distances — guides
- Use table of placards only if no ID
- Intended use

Slide 5.11

The intended use of the ERG is for initial actions to a transportation hazardous materials emergency. Not the best resource for hospitals, but still useful (and required to be included in the curricula under HAZWOPER).

Info Sources to Aid IDHA

- NFPA 704 System
 - Blue = Health
 - Red = Flammability
 - Yellow = Reactivity
 - No color = special hazards

in diamond 0 = No Hazard to 4 = Worst Hazard

Slide 5.12

National Fire Protection Association system. Used at fixed facilities

Ratings from 0 to 4 (4 the worst)

Special hazards may include acid, trefoil (radioactive symbol), W with slash (use no water), pol (potential for polymerization)

What HARM means to you

Toxicity	–	How long can I be exposed?
Flammability	–	How easily does it catch fire?
Solubility	–	What does it mix with?
Specific Gravity	–	Will it sink or float in water?
Vapor Density	–	Will it settle, stay or float away?
Vapor Pressure	–	How easily does it get into the air?
Corrosivity	–	Will it eat away at my suit?
Carcinogenic	–	Could it cause cancer in me?

Slide 5.16

This worksheet can provide vital information on how the substance may act and its threats to personnel and patients.

When & Who

- When do we fill out the HARM form? As soon as the substance is identified, when possible.
- Who fills this out? Trained FRO's or other persons familiar with SDS, NIOSH, etc. and the information needed for the form.

Slide 5.17

Identification of the substance will lead to many answers on how the actions of the facility personnel will be impacted

Healthcare
HARM / Risk Assessment Worksheet

Product Name: _____ UNF (4 digits): _____

DOT Hazard Class: _____ Physical State: _____

ERG Guide #: _____ NFPA: H: _____ F: _____ R: _____ S: _____ (W-4)

Hazard	Physical Description	Hazard Summary
Toxicity Lower # = lower hazard Higher # = higher hazard	LD50 mg/kg LC50 mg/m ³ (4 hr) TLV mg/m ³ (8 hr) TLV mg/m ³ (15 min)	Toxicity? Little, Somewhat, Very
Flammability Lower # = higher hazard Higher # = lower hazard	LEL: %UEL FL: %FL Flashpoint: °F ID: °F	Flammable? Non, Somewhat, Very
Solubility Lower # = higher hazard Higher # = lower hazard	AL: % Soluble in water: (g/100 ml) S.G.: _____ Water (W) Oil (O)	Soluble? Not Soluble, Very Sol Liquid? Float / Sink / Neither
Vapor Density	Water @ 17.5 mmHg @ 33 °C = Low 1.0 1.0 1.0	Vapor? Sink / Float / Neither
Vapor Pressure Higher # = more vapor Lower # = less vapor	mmHg mmHg mmHg	Vapor Production? Low, Medium, High
Corrosivity Lower # = more corrosive Higher # = less corrosive	pH Value pH Value	Corrosive? Corrosive risk to staff? Yes / No
Carcinogenic		Carcinogenic? Carcinogenic risk to staff? Yes / No
Secondary Contamination Risk		Secondary Contamination Risk? Carcinogenic from splash or stain to others? Yes / No
Other Info of Interest:		Other Info of Interest? Can you be handled as an internal medical waste product without special PPE? Yes / No

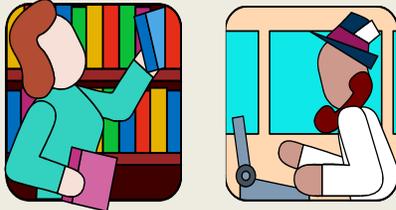
What challenges are there to you handling this? _____

© Institute for Healthcare
HARM / Risk Assessment Worksheet v4.2

Slide 5.18

Chemicals may be identified by name, a four digit UN number, SDS, labels or a variety of other means.

Other Reference Guides



Slide 5.19

There are a number other resources used in hazardous materials. These included printed material and databases.

Reference Sources

- NIOSH Guide
- ATSDR Medical Management Guidelines
- ATSDR Volume II Managing Hospital Incidents

Slide 5.20

Here are some common reference sources used in the hospital setting.

Safety Data Sheet

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA) xylene ←

100 ppm (TWA) ethylbenzene

-ACGIH Threshold Limit Value (TLV):

xylene: 100 ppm (TWA) 150 ppm (STEL), A4 - Not classifiable as a human carcinogen. ←

ethyl benzene: 100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne

Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the

contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH

document, *Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.*

Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator

Slide 5.21

As we go through these different reference sources we will be using the Chemical Xylene. This chemical if found in most healthcare facilities.

At left is a portion of the Safety Data Sheets that gives information on exposure control.

o-Xylene
Cc1ccccc1C
 CAS 95-47-6
 RTECS 222-0000
 OSHA PEL: 100 ppm (400 mg/m³) ST 100 ppm (400 mg/m³)
 NIOSH IDLH: 900 ppm (3600 mg/m³)
 OSHA 900 ppm See 3042

Slide 5.22

The adjacent slide show Xylene information from the NIOSH pocket guide. NIOSH stands for the National Institute for Occupational Safety and Health.

ATSDR Medical Management Guidelines (MMG)

Standards and Guidelines
 OSHA PEL (permissible exposure limit) = 100 ppm (averaged over an 8-hour work shift)
 NIOSH IDLH (immediately dangerous to life or health) = 900 ppm

Exposure values are also found in the General Information section of the MMG.

Page III A.84

Slide 5.23

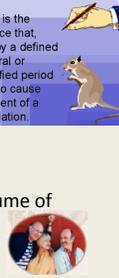
Medical Management Guidelines are available in the 3 volumes of the Agency of Toxic Substances and Disease Registry, (ATSDR). Volume III contains medical management guidelines for acute chemical exposures.

IDHA - Acronyms and Terms

- LD/LC 50
 - Lethal Dose 50%
 - Lethal Concentration 50%
- PPM/MgM³
 - Parts Per Million
 - measured as volume of contaminant to volume of liquid or air collected in sample
 - Milligrams Per Cubic Meter
 - measured as weight of contaminant to volume of air collected in sample

Definition: LD50

LD₅₀ (Lethal Dose₅₀) is the amount of a substance that, when administered by a defined route of entry (e.g. oral or dermal) over a specified period of time, is expected to cause the death of 50 per cent of a defined animal population.



Slide 5.24

LD/LC 50 - lethal dose/ lethal concentration (used in animal experiments to determine when half of the test populations die and then extrapolated to a human population)

PPM/MgM³ - the amount of product in water or air.

With all of these exposure values - the lower the number the more toxic the material.

IDHA - Acronyms and Terms

- TLV™ - **Time Weighted Average (TLV-TWA)**
 - Average concentration that a worker can be exposed to during a 40 hour week/8 hour day without adverse effects.
- TLV-STEL - **Short Term Exposure Limit**
 - Fifteen minute time-weighted average exposure
- TLV-Ceiling (**TLV-C**)
 - Instantaneous levels which should not be exceeded

Slide 5.25

When using Technical References Sources there are many Acronyms used.

TLV™ — Threshold Limit Value (guides) – Time Weighted Average. Exposure limit recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). Level to which nearly all workers may be repeatedly exposed without adverse effect. Time weighted average. 8

hour workday. 40 hour workweek. Derived for the protection of healthy adult male workers. All workers should be able to withstand up to four exposures per day at this concentration with no ill effects (if TLV®-TWA not exceeded). Applied to supplement the TLV®-TWA when there are recognized acute effects from a substance whose toxic effects are primarily of a chronic nature. Time weighted average for 15 minutes.

Look up the exposure values for xylene TWA 100 ppm, STEL (ST) 150 ppm, no Ceiling value. These can be found in the ATSDR MMG, NIOSH Pocket Guide, and SDS. Have the students find the values in each location. Same for IDLH on the next slide.

STEL — Short Term Exposure Limit. (An excursion limit.) The concentration that should not be exceeded during any part of the working exposure.

These are acronyms used in workplace chemical exposure limits.

IDHA - Acronyms and Terms

- IDLH - Immediately **D**angerous to **L**ife & **H**ealth
 - Maximum level from which a worker could escape without any escape impairing symptom or irreversible health effect
- PEL - **P**ermissible **E**xposure **L**imit
 - OSHA standards - therefore are legal limits
 - Based on TLV's and many are identical
 - Include 8 hour PEL, 15 minute STEL, and Ceiling Limit



Slide 5.26

IDLH — Immediately Dangerous to Life & Health Defined as conditions that pose immediate danger to life or health, or conditions that pose a threat of severe exposure. IDLH limits were created mainly to assist in making decisions regarding respirator use: above the IDLH, only supplied air respirators should be used, below the IDLH, air purifying respirators may be used, if appropriate. Two factors were considered when establishing the IDLH limits:

Until the last revision in 1994, an exposure duration of 30 minutes was associated with the IDLH. This is no longer the case. The current definition has no exposure duration associated with it. Workers should not be in an IDLH environment for any length of time unless they are equipped and protected to be in that environment. IDLH values were determined based on animal and human data. They may be found in the NIOSH Pocket Guide to Chemical Hazards, and in other references. <http://response.restoration.noaa.gov/cameo/locs/worklims.html>

IDLH for xylene 900 ppm.

IDHA - Acronyms and Terms



- LEL and UEL
 - Lower Explosive/ Upper Explosive Limit
- FR and FL
 - Flammable Range/Flammable Limit



Slide 5.27

These have to do with fire and explosion. Flash point is covered on the next slide.

Use reference material to compare UEL/UFL, LEL/LFL (flammable range) or benzene, ammonia, hydrogen sulfide, hydrazine. (Use a NIOSH Pocket Guide.)

IDHA - Acronyms and Terms

fire

- **FP - Flash Point**
 - The temperature at which the liquid phase gives off enough vapor to flash when exposed to an external ignition source. [Gasoline = minus 40° F]
- **IT - Ignition Temperature/Fire Point**
 - The temperature at which a liquid is capable of sustained fire with an external ignition source. [Gasoline = minus 35° F]
- **AIT – Auto-Ignition Temperature**
 - The temperature at which a mixture of flammable vapor and air would ignite without a spark or flame. (It is always a higher temperature than the Ignition Temperature) [Gasoline = 536° F and Paper = 451° F]

Slide 5.28

Flash Point then

Ignition Temperature/Ignition Point/Fire Point then

Auto-ignition temperature (Think book title Fahrenheit 451)

IDHA - Acronyms and Terms

- **BP** *Boiling Point*
- **SG** *Specific Gravity*
- **Sol** *Solubility*

Floaters, Sinkers, Swimmers

MSDs

Slide 5.29

Boiling Point - temperature when it goes from a liquid to a vapor.

Specific Gravity - does it float or sink in water.

< 1 - it floats

> 1 - it sinks

For xylene the Specific Gravity is less than 1 and thus it floats.

IDHA - Acronyms and Terms

- **VD** *Vapor Density*
- **VP** *Vapor Pressure*
- **pH** *Acidity/Alkalinity*

Floaters, Sinkers

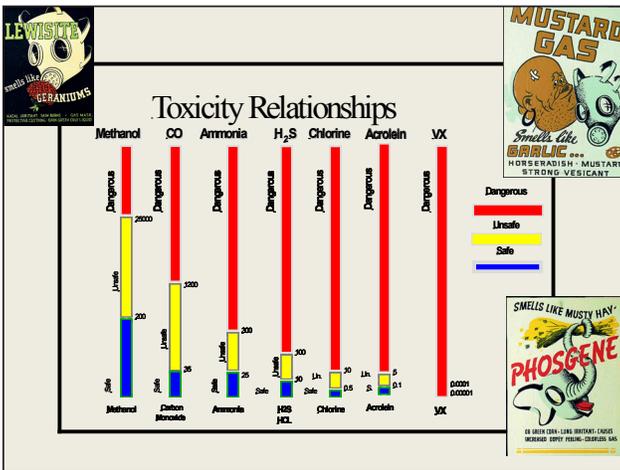
Slide 5.30

Vapor Density - like specific gravity but for vapors.

< 1 - it floats to the top of the air

> 1 - it sinks below the air

Vapor Pressure - how much the substance wants to get out of it's container. The higher the vapor pressure the greater the evaporation rate. Expressed in atmospheres or mm/Hg.



Slide 5.31

Chart at left shows the toxicity relationship between some well know chemicals.

Remember!

- Many hazmats are odorless, colorless and tasteless!
- You may be exposed before you know it!
- Wear PPE
- Approach safely - UUU

<u>Internal</u>	<u>External</u>
Above / Upgrade	Up Hill
Different Ventilation	Up Wind
Out of flow	Up Stream

Slide 5.32

Because many chemicals are odorless, colorless and tasteless it is important to approach from uphill, upwind and upstream. Also proper PPE can protect you until the hazard is determined.

UUU = Up hill, Up wind, Up stream

Limits of Toxicology

- Most exposure levels based on animal tests
- Test results with animals are often different than results with humans

Slide 5.33

Most of these numbers are based on animal tests and are estimates of what a human dose would be.

Routes of Entry and Preventing Exposure



- Inhalation - you breath it
 - Isolate and deny entry
 - Wear SCBA
 - Just stay away!

Slide 5.34

The greatest route of entry hazard to an unprotected responder is inhalation! The oft quoted statistic is that the air sacs (alveoli) if laid out would have the surface area of a tennis court.

Routes of Entry and Preventing Exposure



- Ingestion - you eat it
 - Isolate and deny entry
 - Don't eat, smoke, drink
 - Natural reactions

Slide 5.35

Wearing respiratory protection will help keep you from ingesting hazardous materials. Don't eat, drink or smoke in hazard areas.

Routes of Entry and Preventing Exposure

- Absorption - soaks through skin
 - Isolate and deny entry
 - Wear proper PPE
 - Decon any exposure



Slide 5.36

The second greatest concern and why we wear liquid splash protection usually. The skin is usually a good barrier against many chemicals but a significant number of hazardous materials can pass through the skin. (Many solvents and corrosives are examples.)

Routes of Entry and Preventing Exposure

- Injection - puncture wound
 - Isolate and deny entry
 - Wear proper PPE
 - How can this happen?



Slide 5.37

This is not shooting up in an alleyway. Injection means anything that breaks the integrity of the skin and can send the contaminant into the bloodstream. Puncture wounds (that is why we like steel toed and shanked boots) slips, trips and falls that rip the suit and the skin are concerns.

Variables & Modifying Conditions

- Location
 - Proximity to patients
 - Ability to isolate

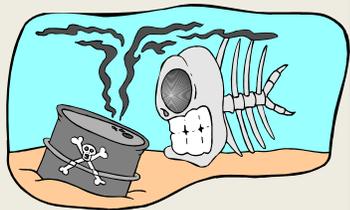


Slide 5.38

When developing information on an incident many factors come into play.

Predicted Behavior

- Before intervention
- Try to predict behavior of release
 - What will it do?
 - Where will it go?
 - What will it hurt?



Slide 5.39

One of the things we try to do is predict the behavior of the release. If internal to the hospital may require a completely different response than an external incident.

Baseline Question

- Before intervention
 - Outcome of natural stabilization?
 - Favorable impact intervention will make?

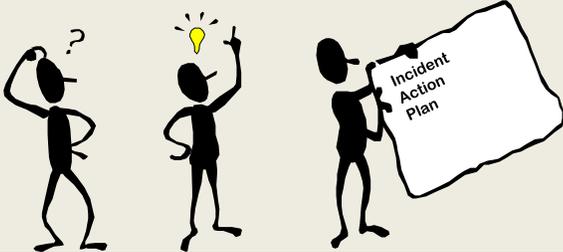


Slide 5.40

Most incidents will self stabilize over time. We need to consider how our intervention will impact the incident in a positive way.

Result

- IDHA is "Intelligence"
- Now ready to Action Plan!



Slide 5.41

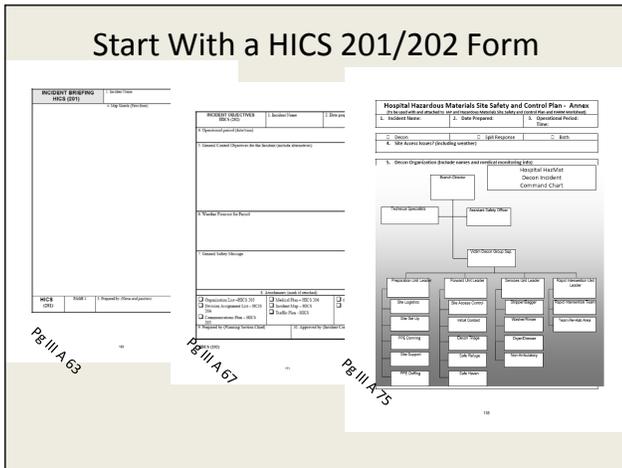
Now that we have obtained intelligence on the hazards and risks we are ready to develop an Action Plan!

Action Planning

- Components of action plans
 - ID the problem
 - ID resources available
 - Use available resources to solve problem

Slide 5.42

This is what most organizations do poorly or not at all.



Slide 5.43

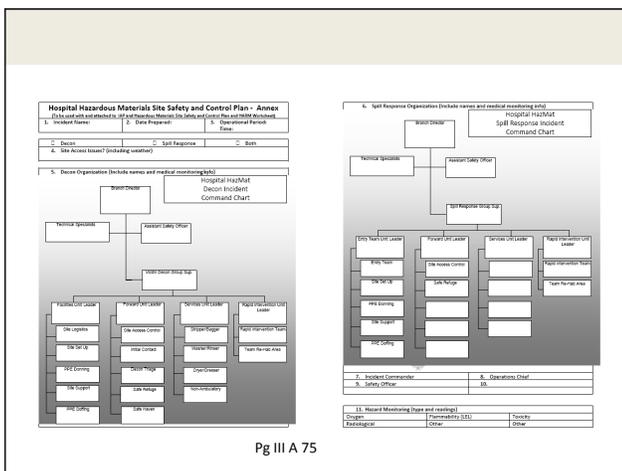
HICS uses several forms that are helpful in developing an Action Plan. Here is a sample. The forms can be found in the supplemental material section of this chapter.

Site Safety Plan

- Required and necessary for a safe and effective response
- Much of the information can be planned before there is an incident

Slide 5.44

Note examples of Site Safety Plans in the HICS forms and another in handouts. These Plans should be filled out for each incident and the information conveyed to all responders. If the decon area or other aspects are consistent, those components of the plan can be pre-filled.



Slide 5.45

This is a simplified IAP along with a Site Safety Plan annex. Organizations are encouraged to plan ahead of time for likely scenarios and develop Incident Action Plans beforehand. For example, if they have a specific area for decon, a site map and directions can be developed and then incident specific information added at the time of the event.

11. Communications			
Report Frequency	Device	Spill Response	Command Property
Hand Signal (Color/Shape)	Visual/Verbal	Designated	Other
Local Radio (Call No.)			
12. Decontamination Objectives			
13. Spill Response Objectives			
14. Type of Spill	<input type="checkbox"/> Professional/Secondary/Other <input type="checkbox"/> Other (List/Specify)	<input type="checkbox"/> Emergency <input type="checkbox"/> Control/Containment/Other	<input type="checkbox"/> Facility <input type="checkbox"/> Other (List/Specify)
15. Written Decon Guidelines and Work Practices and Special Safety Instructions (Include treatment steps in case based on heat stress guidelines, chemical specific hazards and warning signs, decon solutions if other than soap and water)			
16. Response Guidelines and Work Practices and Special Safety Instructions (Include treatment steps in case based on heat stress guidelines, chemical specific hazards and warning signs, tools needed, Response/Decon Guidelines if different than above)			
17. Personal Protective Equipment (PPE) (Multiple Cartridges, Liquid Splash Suit, Double gloves, Special Suits if different)			
Regulatory Name	APF	FRFR	GAH
Other Contact/Decon/Storage/Spill Package	Decon/Chemical/Spill/Other (Specify as Standard/Professional)		
Stripper/Digger/Reducer/Filter/Non-Absorbent	Site Access		
Repeat Intervention	Entry Team		
18. Safety Monitoring (Completion Time)		19. No. Victims	

Slide 5.46

This is a simplified IAP along with a Site Safety Plan annex.

Action Planning

Capabilities & Resources

- Personnel
- Equipment
- Policies/Procedures/Guidelines
- Facilities
 - HVAC
 - Water containment

Slide 5.47

Personnel- Who do you have? (Day/night staffing) What is their training? Are the trained people internal or external. Protection of personnel must be the top priority.

Equipment- Decon, Spill cleanup Do the policies/procedures exist for the type of incident? Will the P&Ps suffice as the basis of an Incident Action Plan?

Facilities- HVAC (Heating, Ventilation, Air Conditioning) - where does the intake come from

and where does the exhaust go (outside, another dept. Can the facility shut down the outside air entirely in the event of the need for in-place protection?

Water Containment- Can runoff be contained. If not what where does it go (storm sewer, waterway, sanitary sewer)?

While the facility is responsible for any contamination caused by runoff water, the priorities will always be life, environment, and property. Do not refrain from conducting decontamination due to inability to contain decon runoff.

Supporting Material

IDHA and Action Plans: (I.A.)

Main Points

- The IDHA Process
- Emergency Response Guidebook
- Hazard and Risk Management Worksheet
- Safety Data Sheets
- SDS as an IDHA Tool
- Importance of Toxicology
- Routes of Entry and Preventing Exposure
- SDS Toxicology Acronyms and Terms
- Dose-Response Relationship
- Other Reference Guides
- Key Physical and Chemical Terms
- Variables/Modifying Conditions on IDHA
- Predicted Behavior and the Baseline Question
- Action Planning

Block Outline

1. The IDHA Process
 - a. One of the most critical aspects (the heart) of a hazardous materials response is “Identification and Hazard Assessment” (IDHA).
 - 1) It can be a long, complex process.
 - 2) OSHA regs require the IC to do IDHA (“identify... all hazardous substances or conditions present..”)
 - 3) *Can’t manage if you can’t identify and assess the problem.*
 - b. Must link Identification with Hazard Assessment, which requires:
 - 1) Identifying chemical names(s) and
 - 2) Assessing the specific hazards of the chemical name(s).
 - c. The basic five step IDHA process:
 - 1) Identify chemical name,
 - 2) Assess all hazards,
 - 3) Assess physical, chemical and toxicological properties,
 - 4) Assess variables/modifying conditions and
 - 5) Predict behavior/outcome.

Block Outline

1. The IDHA Process (continued)

d. Information sources to aid in IDHA:

- 1) SDS (Safety Data Sheets)
- 2) Placards and labels (e.g. colors and symbols)
- 3) Shipping papers (e.g. Bill of Lading, Way Bill, etc.)
- 4) Reference guides (e.g. NA Emergency Response Guidebook)
- 5) Technical information centers (e.g. CHEMTREC)
- 6) NFPA 704 warning system:
 - a) Blue = Health
 - b) Red = Flammability
 - c) Yellow = Reactivity
 - d) No Color = Special Hazard Information
- 7) Computer databases (CAMEO, TOMES, PEAC, etc.)
- 8) Consumer product labeling:
 - a) “Danger” - highest hazard
 - b) “Warning” - moderate hazard
 - c) “Caution” - lowest hazard
- 9) Pipeline markers (product, owner & emergency number)

e. Three information sources preferred minimum for IDHA

Signal Words

16 CFR 1500

Background: “(a)(1) Background and scope. Section 2(p)(1) of the Federal Hazardous Substances Act (FHSA) or ‘the Act’), 15 U.S.C. 1261(p)(1), requires that hazardous substances bear certain cautionary statements on their labels. These statements include: signal words; affirmative statements of the principal hazard(s) associated with a hazardous substance; the common or usual name, or chemical name of the hazardous substance; the name and place of business of the manufacturer...statements of precautionary measures to follow; instructions, when appropriate, for special handling and storage; the statement ‘Keep Out of the Reach of Children’ or its practical equivalent; and, when appropriate, first-aid instructions. Section 2(p)(2) of the Act specifies that all such statements shall be located prominently on the label of such a substance and shall appear in conspicuous and legible type in contrast by typography, layout, or color with other printed matter on the label.”

15 USC §1261(p)(1)

“*DANGER*” On substances which are extremely flammable, corrosive, or highly toxic.

“*WARNING*”

“*CAUTION*” On all other hazardous substances.

“*POISON*” Any hazardous substance which is defined as “highly toxic.”

2. DOT Emergency Response Guidebook (ERG)

- a. ERG purpose: Basic safety tool for basic identification, basic assessment and initial response (recognized good practice/standard for FROs to follow).
 - 1) Use the current version of ERG for transportation-related Haz Mat incidents!
 - 2) Use current SDS if available for other incidents.
- b. ERG page border colors and basic organization:
 - 1) White - Basic information and instructions (+ Placard Table),
 - 2) Yellow – ID number index (materials listed by ID number),
 - 3) Blue - Material name index (materials listed alphabetically),
 - 4) Orange – Numbered guide pages,
 - 5) Green - Table of Initial Isolation and Protective Actions.
- c. ERG is a good “User-Friendly” basic guide but is limited:
 - 1) Classifies by major hazard class or general chemical only.
 - 2) Guides are only the most elemental guidance (cross-verify).
 - a) “P” – polymerization hazard.
 - 3) Isolation and evacuation distances in back of book are guides.
 - a) List of dangerous water–reactive materials.
 - 4) Use table of placards only if materials cannot be identified.
 - a) Guide 111.
 - 5) Intended for use in transportation-related incidents.
 - 6) Intended only for use in “initial response phase.”
- d. Receivers should have ready access to an ERG and other guides, and must know how to efficiently and effectively use them.

Emergency Response Guidebook Exercise

Name	UN#	Guide #	Isolation Distance		Protective Action Distance		Major Hazard
			Small Spill	Large Spill	Small Spill	Large Spill	
Bromine							
Epichlorohydrin							
Fluorine, Refrig, Liquid							
Arsine							
Chloroacetaldehyd							
Resinox							
	2783						
	2683						
	2615						
	1595						
	1050						
	1325						

3. Safety Data Sheets (SDS).

a. Who, What, When and Where of SDSs.

- 1) Required by OSHA Hazard Communication Regulation.
 - a) 29 CFR 1910.1200
 - b) Title 8 CCR §5194
- 2) Required in the “workplace” (not just fixed facilities).
- 3) Informs employees of “hazardous chemicals” present.
- 4) Purpose: ensure that the hazards of all chemicals are:
 - a) Evaluated and that,
 - b) Information is transmitted to employees.
- 5) Methods of transmitting information.
 - a) Comprehensive hazard communication programs,
 - b) Container labeling and other forms of warning,
 - c) Safety data sheets and,
 - d) Employee training.

b. Does not apply to:

- 1) Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device or product,
- 2) Any distilled spirits (beverage alcohols), wine, or malt beverage intended for non-industrial use,
- 3) Consumer products,
- 4) Hazardous waste (including those at waste sites),
- 5) Tobacco and tobacco products,
- 6) Wood and wood products,
- 7) Drugs (legal ones),
- 8) Radiation,
- 9) Biological hazards.

4. SDS as an IDHA Tool

- a. What is it? (IDHA)
- b. How can I protect myself from it? (IDHA)
- c. What will it do to me? (IDHA)
 - 1) SDSs often provide useful toxicological information.

5. Importance of Toxicology.

- a. Related to your life and health!
- b. Many deaths and injuries are to exposed persons. You and other receivers must consider short- and long-term health effects!

6. Definition of Toxicology and Poison.

- a. Toxicology: The study of adverse systemic effects of chemicals.
- b. Poison: Chemical that produces illness or death when taken in very small quantities (DOT: LD50 < 50 mg per kg of body weight):
 - 1) “Poison Gas 2” placard: gas (compressed or liquid),
 - 2) “Poison 6.1” placard: liquid or solid,
 - 3) “Poison 6.2” placard: infectious substance or etiological agent.
- c. Toxicology has limits — Tests usually on animals (rats, guinea pigs, etc.), and there are often wide variations of health effects between animals and humans.

SDSs and IDHA.

Importance: Without Hazard Assessment, Identification means **nothing!**

Priorities: First identify the chemical then use an SDS to assess:

- General, Health and Fire Hazards
- Physical and Chemical Properties
- Variables and Modifying Conditions
- Behavior and Outcomes

Impacts: IDHA impacts selection of:

- Protective Clothing and Equipment
- Containment and Control Methods
- Protective Action Options
- Medical Aid, Decon and Cleanup

SDS can provide pertinent information for all of the above.

Intel vs. Info: Intelligence is information that has been:

- Verified
- Organized
- Analyzed
- Prioritized
- Made useful for valid IDHA.

Use SDS to find “information.”

Use your head to develop “intelligence”!

7. Routes of Entry and Preventing Exposure.

- a. Inhalation—You breathe vapors, fumes, gases, etc.
 - 1) Isolate and deny entry.
 - 2) Wear SCBAs.
 - 3) Just stay away!
- b. Ingestion—You eat it.
 - 1) Isolate and deny entry.
 - 2) Don't eat, smoke or drink near the scene.
 - 3) You have a natural ability to fight off exposures from ingestion (i.e. barfing).
- c. Absorption—Soaks through your skin.
 - 1) Isolate and deny entry.
 - 2) Wear proper PPE.
 - 3) May absorb hazmats through skin, eyes or wounds.
- d. Injection/Physical Contact—Puncture wound.
 - 1) Isolate and deny entry.
 - 2) Wear proper PPE (e.g. steel-toed shoes).
 - 3) Ways this can occur: _____
- e. Remember: many toxic vapors lack color, odor and taste.
 - 1) You may get exposed before you even know it.
 - a) “If you think it is burning, it already is!” Martin Yan.
 - 2) Exposure occurs from approaching downwind, from wind shifts or not wearing protective clothing and SCBAs, etc.

8. SDS Toxicology Acronyms and Terms.

- a. Tools for determining relative toxicity and selecting appropriate levels of PPE. Many measure occupational (chronic) exposures and may not apply to emergency (acute) response exposures.
 - 1) IDLH — Immediately Dangerous to Life and Health,
 - 2) TLV™ — Threshold Limit Value (guides),
 - a) TLV™-TWA
 - b) TLV™-STEL
 - c) TLV™-C
 - 3) STEL — Short-Term Exposure Limit,
 - 4) PEL — Permissible Exposure Limit (law),
 - 5) MLD — Minimum Lethal Dose,
 - 6) LD/LC50 — Lethal Dose/Lethal Concentration 50%,
 - 7) LDlo — Lethal Dose, low,
 - 8) PPM/MgM3 — Parts-Per-Million/Milligrams Per Cubic Meter,
 - 9) ERPG — Emergency Response Planning Guide.

9. Dose-Response Relationship.

- a. Effect produced by a toxic compound depends on the dose of the compound you receive.
- b. Typically, as dose increases, severity of toxic response increases.
 - 1) Humans exposed to 100 ppm of tetrachloroethylene, a solvent that is commonly used for dry cleaning fabrics, may experience relatively mild symptoms, such as headache and drowsiness.
 - 2) Exposure to 200 ppm tetrachloroethylene can result in a loss of motor coordination in some individuals.
 - 3) Exposure to 1,500 ppm tetrachloroethylene for 30 minutes may result in a loss of consciousness.
- c. Severity of toxic effect also depends on duration of exposure.

10. Other Reference Guides.

- a. CHEMTREC – Chemical Transportation Emergency Center.
 - 1) 24 hour technical information center.
 - 2) One person call 1 (800) 424-9300 (stay on phone).
 - 3) Information CHEMTREC will want:
 - a) Name of caller and call back number,
 - b) Name of product, nature and location of problem,
 - c) Shipper or manufacturer, carrier and consignee name,
 - d) Container type and local conditions.
 - 4) Limited primarily to SDS-type info. Will notify shipper, NRC and other industry Mutual Aid teams (e.g. CHLOREP).
- b. Other IDHA reference guides.
 - 1) ATSDR – Medical Management Guidelines.
 - 2) ATSDR, Volume II, Managing Hospital Management Incidents
 - 3) NIOSH Pocket Guide to Chemical Hazards.
 - 4) Condensed Chemical Dictionary.
 - 5) CHRIS Manual.
 - 6) Dangerous Properties of Industrial Chemicals.
 - 7) Farm Chemical Handbook.
 - 8) AAR – Emergency Handling of Hazardous Materials.
 - 9) NFPA Fire Protection Guide to Hazardous Materials.
 - 10) Merck Index.
 - 11) Computer databases.
 - 12) Pesticide labels.

Reference Sources.

- CHEMTREC* 24 hour information center. Operated by the Chemical Manufacturers Association.
- Explosives* *Explosives*, Rudolf Meyer, Comprehensive reference. Publisher: VCH Publishing. Cost: \$250.00
- Hawley's* *Hawley's Condensed Chemical Dictionary*. Basic info about chemicals and chemistry in a dictionary-type format. Publisher: Sax and Lewis. Cost: \$80.00.
- CHRIS* *Chemical Hazards Response Information System*. Detailed information for over 3500 substances. Publisher: U. S. Gov't Printing Office. Cost: \$50.00.
- NIOSH* *Guide National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards*. Toxicological info for over 400 substances. Publisher: U. S. Gov't Printing Office. Cost: \$15.00.
- Sax Book* *Dangerous Properties of Industrial Materials*. Three volume set with detailed info on over 20,000 substances. Publisher: Sax and Lewis. Cost: \$450.00.
- Meisters* *Farm Chemical Handbook*. Detailed info on pesticides and other ag chemicals. Publisher: Meister. Cost: \$80.00.
- AAR Book* *Emergency Handling of Hazardous Materials in Surface Transportation*. ERG-type info for materials listed in 49 CFR 172. Publisher: Assoc. of American Railroads. Cost: \$100.00.
- Merck* *The Merck Index*. Info on over 10,000 chemicals, drugs and biological substances. Publisher: Merck. Cost: \$65.00
- NFPA Guide* *NFPA Fire Protection Guide to Hazardous Materials*. Fire-related info for various hazardous substances. Publisher: NFPA. Cost: \$90.00.

11. Variables/Modifying Conditions on IDHA.

- a. Many variables will impact the hazard assessment, such as:
 - 1) Location (e.g. urban area vs. rural area). In hospital is the patient population in danger?
 - 2) Time/date (e.g. evening or day, business hours, next to a school),
 - 3) Weather (wind, temperature or rain—actual or forecast),
 - 4) Nature of materials (e.g. household bleach vs. liquid chlorine),
 - 5) Stage of incident (e.g. initial stage of release vs. empty tank),
 - 6) Size of problem (potential amount, release rate, etc.),
 - 7) Type, condition, nature and behavior of container,
 - 8) Amount, type and training of responders/receivers and equipment,
 - 9) Availability, type and amount of control agents.
- b. The same material with different variables may significantly change the incident and the way you respond to it.
- c. You may not find these variables in a “book” – use your head!

12. Predicted Behavior and the Baseline Question.

- a. Before intervention, try to predict the behavior of the release. Think about the potential outcome of “natural stabilization.”
 - 1) What will this stuff do?
 - 2) Where will it go?
 - 3) Who will it hurt?
- b. Ask the baseline question:
 - 1) First ask “What if I did nothing?” as a baseline question;
 - 2) Then ask “What favorable impact will my intervention make?”
- c. May need chemist, technical specialist, industrial hygienist or hazmat team for complex incident, multiple hazards, radioactive materials or “Mixed Bag” problem to aid in IDHA, hazard categorization and action planning.
 - 1) “Dangerous” placard,
 - 2) 4-4-4 NFPA 704 symbol.
- d. End result of IDHA is “Intelligence,” which is based on “Information” that is:
 - 1) Verified,
 - 2) Organized,
 - 3) Analyzed,
 - 4) Prioritized and,
 - 5) Made useful.
- e. If you have IDHA intelligence, you’re ready for action planning.

Tips for Identification & Hazard Assessment

Sources: Identification and Assessment Sources

- Safety Data Sheets (SDS)
- Shipping Papers
- Technical Information Centers
- Computer Databases
- Hazmat Technicians and Specialists
- Placards and Labels
- Reference Guides and Books
- NFPA 704 System
- Responsible Party
- Pipeline Markers
- Many Others

Important: Use at least **3** sources for IDHA!

ERG: Emergency Response Guidebook is a basic tool, however, all First Responders/Receivers and Incident Commanders should keep a copy in their vehicles and use it.

CHEMTREC: CHEMTREC operates a 24-hour Technical Information Center and can transmit data to First Responders/Receivers via fax. Have one person call them at (800) 424-9300.

Action Planning—What OSHA Says...

Appendix C to 1910.120 - Compliance guidelines

6. Incident Command System.

FRO: “The first responding senior officer would implement and take command of the ICS. That person would size up the incident and determine if additional personnel and apparatus are necessary; would determine what actions to take to control the leak; and determine the proper level of personal protective equipment.” (In other words, the first responder/receiver will develop an action plan.)

7. Site Safety and Control Plans.

Plans: “The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site.”

Plan Contents: “A comprehensive site safety and control plan should include the following: summary analysis of hazards on the site and a risk analysis of those hazards; site map or sketch; site work zones (clean zone, transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contaminate monitoring, etc.); decontamination procedures and area; and other relevant areas. This plan should be a part of the employer’s emergency response plan or an extension of it to the specific site.”

Pesticide Label Info

- Availability: “A copy of the registered labeling that allows the manner in which the pesticide is being used shall be available at each use site.” (Title 3 CCR §6602)
- Placement: “The label shall appear on the pesticide or the immediate container thereof. If the immediate container is enclosed within a wrapper or outside container through which the label cannot be clearly read by a person with normal vision, the label must also appear on such outside wrapper or container if it is a part of the retail package.” (Title 3 CCR §6237)
- Statements: “Warning or caution statements...must appear on the label in a place sufficiently prominent to warn the user, and must state clearly and in non-technical language the particular hazard involved in the use of the pesticide, e.g., ingestion, skin absorption, inhalation, flammability or explosion, and the precautions to be taken to avoid accident, injury, or damage.”
- (a) The label of every pesticide shall bear warnings or cautions which are necessary for the protection of the public, including the statement, “Keep out of reach of children,” and a signal word such as “Danger,” “Warning,” or “Caution” as the director may prescribe, on the front panel or that part of the label displayed...
 - (b) The label of every pesticide which is highly toxic to man shall bear the word “Danger” along with the word “Poison” in red on contrasting background in immediate proximity to the skull and crossbones, and an antidote statement including directions to call a physician immediately on the front panel or that part of the label displayed...”(Title 3 CCR §6242)

Minimizing Exposure in a Response

- The Law:* “The individual in charge of the ICS shall limit the number of emergency response/receiving personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations.” 29 CFR 1910.120(q)(3)(v), Title 8 CCR 5192(q)(3)(E)
- Inhalation:* Approach the scene from upwind.
Establish control zones.
Require all entry teams to wear SCBAs.
Evaluate potential vapor/gas dispersion.
Consider the possibility of wind shifts.
Decontaminate all exposed personnel and equipment.
- Absorption:* Require all entry teams to wear proper PPE.
Isolate all sources of potential exposure.
Decontaminate all exposed personnel and equipment.
- Ingestion:* Forbid eating, drinking and smoking until decon is complete.
Require all responders/receivers to thoroughly wash hands, face and hair.
Decontaminate all exposed personnel and equipment.
- Injection:* Require all responders/receivers to wear proper PPE and basic safety equipment (hardhats, steel-toed shoes, gloves, etc.).
Evaluate hazards of debris, wreckage, etc.

Participant Worksheet

1. In your own words, identify the link between “Identification” of the chemical name and “Assessing” the analysis of the chemical hazards:

2. List at least three (3) common sources for IDHA:

3. List the five (5) basic steps of IDHA:

4. Per attached DOT Emergency Response Guidebook Exercise, (or 6 chemical names + 6 UN ID numbers provided by the instructor) identify the UN ID number/chemical name, Guide Page Number, Primary Hazard, and Initial Isolation and Protective Action Distances as required using a DOT Emergency Response Guidebook.

Physical and Chemical Properties

BP	Boiling Point. The temperature at which a liquid will evaporate at its fastest rate and become a gas or vapor.
Concern:	At which temperature will this material vaporize and become an airborne hazard? (Hint: Compare the boiling point with the air temperature.)
FP	Flash Point. The lowest temperature at which evaporation of a substance produces sufficient vapor to form an ignitable mixture with air.
Concern	At what temperature will this material flash but not necessarily continue to burn? (Hint: Compare the flash point with the air temperature)
IT	Ignition Temperature. The minimum temperature at which the material will ignite without a spark or flame being present.
Concern:	At which temperature will this material burn on its own? (Hint: Compare the ignition temperature with the air temperature)
FR/FL	Flammable Range and Flammable Limit (also called UEL and LEL- Upper Explosive and Lower Explosive Limit). The range of concentration (usually expressed as a percentage) of a flammable gas or vapor, in air, at which fire or explosion can occur upon ignition.
Concern:	What is the possibility of this material igniting. (Hint: A wider range indicates a greater hazard)
Sol	Solubility. The amount, in pounds, of a material that will dissolve in 100 pounds of water. Solubility usually increases with temperature.
Concern:	Will this material mix with water? (Hint: What is the temperature of the water this material may end up in?)
SG	Specific Gravity. The ratio of the weight of the material to the weight of an equal volume of water. Greater than 1, it sinks. Less than 1, it floats.
Concern:	What will this material do when it enters a body of water? If this material is burning, would water be an effective extinguishing agent? (Hint: Petroleum products usually have a specific gravity less than 1. Pesticides often have a specific gravity greater than 1)
VD	Vapor Density. The ratio of weight of a vapor or gas to the weight of an equal volume of dry air at the same temperature and pressure.
Concern:	Will the vapors from the material rise or fall? (Hint: Compare the boiling point with the air temperature. Vapors coming from extremely cold liquids may fall even though their vapor density is less than 1.)

Physical and Chemical Properties

VP	<p>Vapor Pressure. The pressure exerted by vapor that is in equilibrium with the liquid at a specified temperature. The pressure a saturated vapor exerts over its own liquid that is confined in a closed container. A measure of a liquid's tendency to evaporate. Usually expressed in millimeters of mercury (mmHG).</p> <p>Examples:</p> <ul style="list-style-type: none">- Mercury - 0.0012- Water - 17.5- Benzene- 80.0- Acetone- 215.0
Concern:	<p>What is the possibility of this material evaporating and spreading downwind? (Hint: Pay attention to the time of day of the release and the type of surface material it is on since vapor pressure varies greatly with temperature.)</p>
PH	<p>Acidity/Alkalinity. The measure of the degree of acidity or alkalinity of a solution. A pH of less than 7 indicates the presence of an acid. A pH of greater than 7 indicates the presence of an alkaline substance.</p>
Concern:	<p>Will this material react with other materials? (Hint: Get advice from competent sources when responding to incidents involving these materials since their reaction with other materials can vary greatly.)</p>

Practical Exercise (H.A.R.M. worksheet)

Using the substance Xylene

Pages that follow:

1. H.A.R.M. Worksheet
2. NIOSH Guide excerpt
3. Safety Data Sheet
4. 2012 DOT ERG Pages


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NIOSH National Institute for Occupational Safety and Health

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NIOSH Publication No. 2005-151:

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home Introduction Synonyms & Trade Names Chemical Names CAS Numbers RTECS Numbers Appendices Search			
o-Xylene			CAS 95-47-6
C₆H₄(CH₃)₂			RTECS ZE2450000
Synonyms & Trade Names 1,2-Dimethylbenzene; ortho-Xylene; o-Xylol			DOT ID & Guide 1307 130
Exposure Limits	NIOSH REL: TWA 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³)		
	OSHA PEL†: TWA 100 ppm (435 mg/m ³)		
IDLH 900 ppm See: 95476	Conversion 1 ppm = 4.34 mg/m ³		
Physical Description Colorless liquid with an aromatic odor.			
MW: 106.2	BP: 292°F	FRZ: -13°F	Sol: 0.02%
VP: 7 mmHg	IP: 8.56 eV		Sp.Gr: 0.88
Fl.P: 90°F	UEL: 6.7%	LEL: 0.9%	
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactivities Strong oxidizers, strong acids			
Measurement Methods NIOSH 1501 , 3800 ; OSHA 1002 See: NMAM or OSHA Methods			
Personal Protection & Sanitation (See protection) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA Up to 900 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)* (APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)* (APF = 10) Any supplied-air respirator* (APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus Important additional information about respirator selection			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis			



Xylene

Material Safety Data Sheet

CITGO Petroleum Corporation
 1701 Golf Road, Suite 1-1101
 Rolling Meadows, IL 60008-4295

MSDS No. 07306
Revision Date 8/22/2012

IMPORTANT: This MSDS is prepared in accordance with 29 CFR 1910.1200. Read this MSDS before transporting, handling, storing or disposing of this product and forward this information to employees, customers and users of this product.

Hazard Rankings		
	HMIS	NFPA
Health Hazard	* 2	2
Fire Hazard	3	3
Reactivity	0	0

* = Chronic Health Hazard

Emergency Overview			
Physical State	Liquid.		
Color	Transparent, colorless.	Odor	Sweet, pungent aromatic hydrocarbon.
WARNING:			
Flammable liquid; vapor may cause flash fire.			
Harmful or fatal if swallowed - Can enter lungs and cause damage.			
Can cause eye, skin or respiratory tract irritation.			
Overexposure can cause central nervous system (CNS) depression and/or other target organ effects.			
Breathing high concentrations can cause irregular heartbeats which may be fatal.			
Harmful to aquatic organisms.			

Protective Equipment
Minimum Recommended See Section 8 for Details

SECTION 1. PRODUCT IDENTIFICATION

Trade Name	Xylene	Technical Contact	(847) 734-7699 (8am - 4pm CT M-F)
Product Number	07306	Medical Emergency	(832) 486-4700
CAS Number	Mixture.	CHEMTREC Emergency (United States Only)	(800) 424-9300
Product Family	Petroleum hydrocarbon solvent		
Synonyms	Xylo; Mixed Xylenes; Xylene Isomers and Ethylbenzene; Dimethylbenzenes and Ethylbenzene; C8 Alkylbenzenes; C8 Aromatics; C8 Aromatic Hydrocarbon Solvent; Industrial-grade Xylene (meets ASTM D-364 Specifications); "Ten-degree" Xylene (meets ASTM D-846 Specifications). CITGO® Material Code: 07306		

SECTION 2. COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
Xylene, all isomers	1330-20-7	60 - 100
Ethylbenzene	100-41-4	10 - 30
Toluene	108-88-3	<1

Xylene

SECTION 3. HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact. Eye contact. Inhalation. Ingestion.

Signs and Symptoms of Acute Exposure

Inhalation Breathing high concentrations may be harmful. Mist or vapor can irritate the throat and lungs. Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness, or unconsciousness. Breathing high concentrations of this material, for example, in an enclosed space or by intentional abuse, can cause irregular heartbeats which can cause death.

Eye Contact This material can cause eye irritation with tearing, redness, or a stinging or burning feeling. Further, it can cause swelling of the eyes with blurred vision. Effects may become more serious with repeated or prolonged contact.

Skin Contact May cause mild skin irritation with redness and/or an itching or burning feeling. Effects may become more serious with repeated or prolonged contact. It is likely that some components of this material are able to pass into the body through the skin and may cause similar effects as from breathing or swallowing it.

Ingestion Swallowing this material may be harmful. Swallowing this material may cause stomach or intestinal upset with pain, nausea, and/or diarrhea. This material can get into the lungs during swallowing or vomiting. Small amounts in the lungs can cause lung damage, possibly leading to chronic lung dysfunction or death. Swallowing this material may cause effects similar to those described in the inhalation section (see "inhalation" above).

Chronic Health Effects Summary Prolonged and/or repeated contact may cause skin irritation and inflammation. Symptoms include defatting, redness, blistering, lesions, and scaly dermatitis.

Chronic effects of ingestion and subsequent aspiration into the lungs may cause pneumatocele (lung cavity) formation and chronic lung dysfunction.

Reports have associated repeated and prolonged occupational overexposure to light petroleum products with irreversible brain and nervous system damage (sometimes referred to as "Solvent or Painter's Syndrome"). Intentional misuse by deliberately concentrating and inhaling this product may be harmful or fatal.

Prolonged or repeated overexposure to xylene, a component of this product, has been associated with hearing damage in laboratory animals.

This material (or a component) may cause harm to the human fetus based on tests with laboratory animals. This material, or a component of this material, has been shown to cause cancer in laboratory animals. The relevance of this to humans is not clear.

See Toxicological Information (Section 11)

Conditions Aggravated by Exposure Disorders of the following organs or organ systems that may be aggravated by significant exposure to this material or its components include: Skin, Respiratory System, Liver, Kidneys, Central Nervous System (CNS), Heart (Cardiac)

Target Organs May cause damage to the following organs: blood, kidneys, lungs, liver, mucous membranes, heart, upper respiratory tract, skin, auditory system, central nervous system (CNS), eye, lens or cornea

Carcinogenic Potential This material contains ethylbenzene at concentrations at or above 0.1%. Ethylbenzene is considered possibly carcinogenic to humans by IARC (Group 2B) based on laboratory animal studies.

Xylene

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	<input checked="" type="checkbox"/>	Sensitizer	<input type="checkbox"/>	Combustible	<input type="checkbox"/>	Explosive	<input type="checkbox"/>	Pyrophoric	<input type="checkbox"/>
Toxic	<input type="checkbox"/>	Highly Toxic	<input type="checkbox"/>	Flammable	<input checked="" type="checkbox"/>	Oxidizer	<input type="checkbox"/>	Water-reactive	<input type="checkbox"/>
Corrosive	<input type="checkbox"/>	Carcinogenic	<input type="checkbox"/>	Compressed Gas	<input type="checkbox"/>	Organic Peroxide	<input type="checkbox"/>	Unstable	<input type="checkbox"/>

SECTION 4. FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation	Immediately move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately.
Eye Contact	Flush eyes with cool, clean, low-pressure water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye and eyelid tissue. If easily accomplished, check for and remove contact lenses. If contact lenses cannot be removed, seek immediate medical attention. Do not use eye ointment. Seek medical attention.
Skin Contact	Remove contaminated shoes and clothing. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. Do not use ointments. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists.
Ingestion	Do not induce vomiting. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to a person who is not fully conscious. Do not leave victim unattended. Seek medical attention immediately.
Notes to Physician	<p>INHALATION: Inhalation overexposure can produce toxic effects. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Administer supplemental oxygen with assisted ventilation, as required.</p> <p>This material (or a component) sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.</p> <p>INGESTION: If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.</p>

SECTION 5. FIRE FIGHTING MEASURES

NFPA Flammability Classification	NFPA Class-IC flammable liquid.
Flash Point	Closed cup: 27°C (81°F).

Xylene

Autoignition Temperature	AP 432°C (810°F)
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons, aldehydes and other products of incomplete combustion.
Special Properties	Flammable Liquid! This material releases vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, its vapor can cause a flash fire. Use only with adequate ventilation. Vapors are heavier than air and may travel long distances along the ground to an ignition source and flash back. A vapor and air mixture can create an explosion hazard in confined spaces such as sewers. If container is not properly cooled, it can rupture in the heat of a fire.
Extinguishing Media	SMALL FIRE: Use dry chemicals, carbon dioxide, foam, or inert gas (nitrogen). Carbon dioxide and inert gas can displace oxygen. Use caution when applying carbon dioxide or inert gas in confined spaces. LARGE FIRE: Use foam, water fog, or water spray. Water may be ineffective. Water may not extinguish the fire. Water fog and spray are effective in cooling containers and adjacent structures. However, water can be used to cool the external walls of vessels to prevent excessive pressure, autoignition or explosion. DO NOT use a solid stream of water directly on the fire as the water may spread the fire to a larger area.
Protection of Fire Fighters	Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles. Cover pooling liquid with foam. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines. Be aware that burning liquid will float on water. Notify appropriate authorities of potential fire and explosion hazard if liquid enter sewers or waterways.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Flammable Liquid! Release causes an immediate fire or explosion hazard. Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security. A vapor-suppressing foam may be used to reduce vapors. Eliminate all ignition sources. All equipment used when handling this material must be grounded. Stop the leak if it can be done without risk. Do not touch or walk through spilled material. Remove spillage immediately from hard, smooth walking areas. Prevent spilled material from entering waterways, sewers, basements, or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to appropriate waste containers. Use clean, non-sparking tools to collect absorbed material.

For large spills, secure the area and control access. Prevent spilled material from entering sewers, storm drains, other drainage systems, and natural waterways. Dike far ahead of a liquid spill to ensure complete collection. Water mist or spray may be used to reduce or disperse vapors; but, it may not prevent ignition in closed spaces. This material will float on water and its run-off may create an explosion or fire hazard. Verify that responders are properly HAZWOPER-trained and wearing appropriate respiratory equipment and fire-resistant protective clothing during cleanup operations. In an urban area, cleanup spill as soon as possible; in natural environments, cleanup on advice from specialists. Pick up free liquid for recycle and/or disposal if it can be accomplished safely with explosion-proof equipment. Collect any excess material with absorbent pads, sand, or other inert non-combustible absorbent materials. Place into appropriate waste containers for later disposal. Comply with all applicable local, state and federal laws and regulations.

Xylene

SECTION 7. HANDLING AND STORAGE

Handling

A spill or leak can cause an immediate fire or explosion hazard. Keep containers closed and do not handle or store near heat, sparks, or any other potential ignition sources. Avoid contact with oxidizing agents. Do NOT breathe vapor. Use only with adequate ventilation and personal protection. Never siphon by mouth. Avoid contact with eyes, skin, and clothing. Prevent contact with food and tobacco products. Do NOT take internally.

When performing repairs and maintenance on contaminated equipment, keep unnecessary persons away from the area. Eliminate all potential ignition sources. Drain and purge equipment, as necessary, to remove material residues. Follow proper entry procedures, including compliance with 29 CFR 1910.146 prior to entering confined spaces such as tanks or pits. Use gloves constructed of impervious materials and protective clothing if direct contact is anticipated. Use appropriate respiratory protection when concentrations exceed any established occupational exposure level (See Section 8) Promptly remove contaminated clothing. Wash exposed skin thoroughly with soap and water after handling.

Non-equilibrium conditions may increase the fire hazard associated with this product. A static electrical charge can accumulate when this material is flowing through pipes, nozzles or filters and when it is agitated. A static spark discharge can ignite accumulated vapors particularly during dry weather conditions. Always bond receiving containers to the fill pipe before and during loading. Always confirm that receiving container is properly grounded. Bonding and grounding alone may be inadequate to eliminate fire and explosion hazards associated with electrostatic charges. Carefully review operations that may increase the risks associated with static electricity such as tank and container filling, tank cleaning, sampling, gauging, loading, filtering, mixing, agitation, etc. In addition to bonding and grounding, efforts to mitigate the hazards of an electrostatic discharge may include, but are not limited to, ventilation, inerting and/or reduction of transfer velocities. Dissipation of electrostatic charges may be improved with the use of conductivity additives when used with other mitigation efforts, including bonding and grounding. Always keep nozzle in contact with the container throughout the loading process.

Do NOT fill any portable container in or on a vehicle. Do NOT use compressed air for filling, discharging or other handling operations. Product container is NOT designed for elevated pressure. Do NOT pressurize, cut, weld, braze solder, drill, or grind on containers. Do NOT expose product containers to flames, sparks, heat or other potential ignition sources. Empty containers may contain material residues which can ignite with explosive force. Observe label precautions.

Storage

Keep container tightly closed. Store in a cool, dry, well-ventilated area. Store only in approved containers. Do not store with oxidizing agents. Do not store at elevated temperatures or in direct sunlight. Protect containers against physical damage. Head spaces in tanks and other containers may contain a mixture of air and vapor in the flammable range. Vapor may be ignited by static discharge. Storage area must meet OSHA requirements and applicable fire codes. Additional information regarding the design and control of hazards associated with the handling and storage of flammable and combustible liquids may be found in professional and industrial documents including, but not limited to, the National Fire Protection Association (NFPA) publications NFPA 30 ("Flammable and Combustible Liquid Code"), NFPA 77 ("Recommended Practice on Static Electricity") and the American Petroleum Institute (API) Recommended Practice 2003, ("Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents").

Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls Provide ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below. All electrical equipment should comply with the National Electrical Code. An emergency eye wash station and safety shower should be located near the work-station.

Personal Protective Equipment Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.



Eye Protection Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material. A suitable emergency eye wash water and safety shower should be located near the work station.

Hand Protection Avoid skin contact. Use heavy duty gloves constructed of chemical resistant materials such as Viton®. Wash hands with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities or leaving work. DO NOT use gasoline, kerosene, solvents or harsh abrasives as skin cleaners.

Body Protection Avoid skin contact. Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discard contaminated leather goods.

Respiratory Protection For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134). For airborne vapor concentrations that exceed the recommended protection factors for organic vapor respirators, use a full-face, positive-pressure, supplied air respirator. Due to fire and explosion hazards, do not enter atmospheres containing concentrations greater than 10% of the lower flammable limit of this product.

General Comments Warning! Use of this material in spaces without adequate ventilation may result in generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

Occupational Exposure Guidelines

Substance	Applicable Workplace Exposure Levels
Xylene, all isomers	ACGIH (United States). TWA: 100 ppm 8 hour(s). STEL: 150 ppm 15 minute(s).
	OSHA (United States). TWA: 100 ppm 8 hour(s).
Ethylbenzene	ACGIH (United States). TWA: 100 ppm 8 hour(s). STEL: 125 ppm 15 minute(s).
	OSHA (United States). TWA: 100 ppm 8 hour(s).
Toluene	ACGIH (United States). Skin TWA: 20 ppm 8 hour(s).

OSHA (United States).

TWA: 200 ppm 8 hour(s).

CEIL: 300 ppm

PEAK: 500 ppm 1 times per shift, 10 minute(s).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES (TYPICAL)

Physical State	Liquid.	Color	Transparent, colorless.	Odor	Sweet, pungent aromatic hydrocarbon.
Specific Gravity	0.87 (Water = 1)	pH	Not Applicable.	Vapor Density	3.70 (Air = 1)
Boiling Range	138 - 142°C (280 - 288°F)		Melting/Freezing Point	-48 to -25°C (-54 to -13°F)	
Vapor Pressure	0.9 kPa (7 mm Hg) (at 20°C)		Volatility	872 g/l VOC (w/v)	
Solubility in Water	Very slightly soluble in cold water. (<0.1 % w/w)		Viscosity (cSt @ 40°C)	Not available.	
Flash Point	Closed cup: 27°C (81°F).				
Additional Properties	Conductivity = < 5 picosiemens/meter (unadditized).				

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability	Stable.	Hazardous Polymerization	Not expected to occur.
Conditions to Avoid	Keep away from heat, flame and other potential ignition sources. Keep away from strong oxidizing conditions and agents.		
Materials Incompatibility	Strong acids, alkalis, and oxidizers such as liquid chlorine, hydrogen peroxide, and oxygen.		
Hazardous Decomposition Products	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.		

SECTION 11. TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data	<p>Xylene, all isomers Effects from Acute Exposure: ORAL (LD₅₀), Acute: 4,300 mg/kg [Rat]. INHALATION (LC₅₀), Acute: 4,550 ppm for four hours [Rat]. DERMAL (LD₅₀), Acute: 14,100 uL/kg [Rabbit]. Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross over-exposure.</p> <p>Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure.</p>
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Xylene

Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

Ethylbenzene

Effects from Acute Exposure:

ORAL (LD50), Acute: 3,500 mg/kg [Rat].

DERMAL (LD50), Acute: 17,800 uL/kg [Rabbit].

INTRAPERITONEAL (LD50), Acute: 2,624 mg/kg [Rat].

Effects from Prolonged or Repeated Exposure:

Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). Also, the incidence of tumors was elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

This mixture contains components that are potentially toxic to freshwater and saltwater ecosystems.

Environmental Fate

Biodegradability: Rapidly biodegradable in aerobic conditions.

Partition Coefficient (log Kow): 2 to 3 (based on similar materials)

Photodegradation: Based on similar materials, this product will have a significant tendency to partition to air. Hydrocarbons from this product which do partition to air are expected to rapidly photodegrade.

Stability in Water: Degradation of this product in water occurs primarily by microbial action.

Distribution: Principally to air.

SECTION 13. DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Maximize material recovery for reuse or recycling. Non-usable product is regulated by US EPA as a hazardous waste (U239). Recovered non-usable material may be regulated by US EPA as a hazardous waste due to its ignitibility (D001) and/or its toxic (D018) characteristics. It is the responsibility of the user to determine if the material is a RCRA "hazardous waste" at the time of disposal. Transportation, treatment, storage and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14. TRANSPORT INFORMATION

The shipping description below may not represent requirements for all modes of transportation, shipping methods or locations outside of the United States.

US DOT Status	A U.S. Department of Transportation regulated material.		
Proper Shipping Name	RQ, Xylenes, 3, UN 1307, PG II or III		
Hazard Class	3	Packing Group	II or III
		UN/NA Number	UN1307
Reportable Quantity	RQ 100 lbs. [Based upon maximum Xylene concentration of 100% and an RQ of 100 lbs.]		
Placard(s)		Emergency Response Guide No.	130
		MARPOL III Status	Not a DOT "Marine Pollutant" per 49 CFR 171.8.

SECTION 15. REGULATORY INFORMATION

TSCA Inventory	This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.
SARA 302/304 Emergency Planning and Notification	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.
SARA 311/312 Hazard Identification	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: Fire, Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard
SARA 313 Toxic Chemical Notification and Release Reporting	This product contains the following components in concentrations above <i>de minimis</i> levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA: Xylene, all isomers [CAS No.: 1330-20-7] Concentration: 70 - 90% Ethylbenzene [CAS No.: 100-41-4] Concentration: 10 - 30%
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are: Xylene, all isomers [CAS No.: 1330-20-7] RQ = 100 lbs. (45.36 kg) Concentration: 60 - 100% Ethylbenzene [CAS No.: 100-41-4] RQ = 1000 lbs. (453.6 kg) Concentration: 10 - 30% Benzene [CAS No.: 71-43-2] RQ = 10 lbs. (4.536 kg) Concentration: <0.01%
Clean Water Act (CWA)	This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

Xylene

California Proposition 65

This material may contain the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm, and may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Ethylbenzene: 10 - 30%

Toluene: <1%

Benzene: <0.01%

New Jersey Right-to-Know Label

For New Jersey R-T-K labeling requirements, refer to components listed in Section 2.

Additional Remarks

Federal Hazardous Substances Act, related statutes, and Consumer Product Safety Commission regulations, as defined by 16 CFR 1500.14(b)(3) and 1500.83(a)(13): This product contains Xylene which may require special labeling if distributed in a manner intended or packaged in a form suitable for use in the household or by children. Precautionary label dialogue should display the following: **DANGER: Contains Xylene! Harmful or fatal if swallowed! Call Physician Immediately. Vapor Harmful! KEEP OUT OF REACH OF CHILDREN!**

SECTION 16. OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number 4.6

Revision Date 8/22/2012

ABBREVIATIONS

AP: Approximately EQ: Equal >: Greater Than <: Less Than

NA: Not Applicable ND: No Data NE: Not Established

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA: American Industrial Hygiene Association

IARC: International Agency for Research on Cancer

NIOSH: National Institute of Occupational Safety and Health

NPCA: National Paint and Coating Manufacturers Association

EPA: US Environmental Protection Agency

HMIS: Hazardous Materials Information System

OSHA: Occupational Safety and Health Administration

NTP: National Toxicology Program

NFPA: National Fire Protection Association

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ID No.	Guide No.	Name of Material	ID No.	Guide No.	Name of Material
1287	127	Rubber solution	1314	133	Calcium resinate, fused
1288	128	Shale oil	1318	133	Cobalt resinate, precipitated
1289	132	Sodium methylate, solution in alcohol	1320	113	Dinitrophenol, wetted with not less than 15% water
1292	129	Ethyl silicate	1321	113	Dinitrophenolates, wetted with not less than 15% water
1292	129	Tetraethyl silicate	1322	113	Dinitroresorcinol, wetted with not less than 15% water
1293	127	Tinctures, medicinal	1323	170	Ferrocium
1294	130	Toluene	1324	133	Films, nitrocellulose base
1295	139	Trichlorosilane	1325	133	Flammable solid, n.o.s.
1296	132	Triethylamine	1325	133	Flammable solid, organic, n.o.s.
1297	132	Trimethylamine, aqueous solution	1325	133	Fusee (rail or highway)
1298	155	Trimethylchlorosilane	1326	170	Hafnium powder, wetted with not less than 25% water
1299	128	Turpentine	1327	133	Bhusa, wet, damp or contaminated with oil
1300	128	Turpentine substitute	1327	133	Hay, wet, damp or contaminated with oil
1301	129P	Vinyl acetate, stabilized	1327	133	Straw, wet, damp or contaminated with oil
1302	127P	Vinyl ethyl ether, stabilized	1328	133	Hexamethylenetetramine
1303	130P	Vinylidene chloride, stabilized	1328	133	Hexamine
1304	127P	Vinyl isobutyl ether, stabilized	1330	133	Manganese resinate
1305	155P	Vinyltrichlorosilane	1331	133	Matches, "strike anywhere"
1305	155P	Vinyltrichlorosilane, stabilized	1332	133	Metaldehyde
1306	129	Wood preservatives, liquid	1333	170	Cerium, slabs, ingots or rods
1307	130	Xylenes	1334	133	Naphthalene, crude
1308	170	Zirconium metal, liquid suspension	1334	133	Naphthalene, refined
1308	170	Zirconium suspended in a flammable liquid	1336	113	Nitroguanidine (Picrite), wetted with not less than 20% water
1308	170	Zirconium suspended in a liquid (flammable)	1336	113	Nitroguanidine, wetted with not less than 20% water
1309	170	Aluminum powder, coated	1336	113	Picrite, wetted
1310	113	Ammonium picrate, wetted with not less than 10% water	1337	113	Nitrostarch, wetted with not less than 20% water
1312	133	Borneol			
1313	133	Calcium resinate			

Name of Material	Guide No.	ID No.	Name of Material	Guide No.	ID No.
Vanadyl sulphate	151	2931	Water-reactive solid, oxidizing, n.o.s.	138	3133
Vehicle, flammable gas powered	128	3166	Water-reactive solid, poisonous, n.o.s.	139	3134
Vehicle, flammable liquid powered	128	3166	Water-reactive solid, self-heating, n.o.s.	138	3135
Vehicle, fuel cell, flammable gas powered	128	3166	Water-reactive solid, toxic, n.o.s.	139	3134
Vehicle, fuel cell, flammable liquid powered	128	3166	Wheelchair, electric, with batteries	154	3171
Vinyl acetate, stabilized	129P	1301	White asbestos	171	2590
Vinyl bromide, stabilized	116P	1085	White phosphorus, dry	136	1381
Vinyl butyrate, stabilized	129P	2838	White phosphorus, in solution	136	1381
Vinyl chloride, stabilized	116P	1086	White phosphorus, molten	136	2447
Vinyl chloroacetate	155	2589	White phosphorus, under water	136	1381
Vinyl ethyl ether, stabilized	127P	1302	Wood preservatives, liquid	129	1306
Vinyl fluoride, stabilized	116P	1860	Wool waste, wet	133	1387
Vinylidene chloride, stabilized	130P	1303	Xanthates	135	3342
Vinyl isobutyl ether, stabilized	127P	1304	Xenon	121	2036
Vinyl methyl ether, stabilized	116P	1087	Xenon, compressed	121	2036
Vinylpyridines, stabilized	131P	3073	Xenon, refrigerated liquid (cryogenic liquid)	120	2591
Vinyltoluenes, stabilized	130P	2618	Xylenes	130	1307
Vinyltrichlorosilane	155P	1305	Xylenols	153	2261
Vinyltrichlorosilane, stabilized	155P	1305	Xylenols, liquid	153	3430
VX	153	2810	Xylenols, solid	153	2261
Water-reactive liquid, corrosive, n.o.s.	138	3129	Xylidines	153	1711
Water-reactive liquid, n.o.s.	138	3148	Xylidines, liquid	153	1711
Water-reactive liquid, poisonous, n.o.s.	139	3130	Xylidines, solid	153	1711
Water-reactive liquid, toxic, n.o.s.	139	3130	Xylidines, solid	153	3452
Water-reactive solid, corrosive, n.o.s.	138	3131	Xylyl bromide	152	1701
Water-reactive solid, flammable, n.o.s.	138	3132	Xylyl bromide, liquid	152	1701
Water-reactive solid, n.o.s.	138	2813	Xylyl bromide, solid	152	3417
			Yellow phosphorus, dry	136	1381

**GUIDE
130****FLAMMABLE LIQUIDS
(NON-POLAR/WATER-IMMISCIBLE/NOXIOUS)****ERG2012****POTENTIAL HAZARDS****FIRE OR EXPLOSION**

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

HEALTH

- May cause toxic effects if inhaled or absorbed through skin.
- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION**Large Spill**

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

ERG2012

FLAMMABLE LIQUIDS
(NON-POLAR/WATER-IMMISCIBLE/NOXIOUS)

GUIDE
130

EMERGENCY RESPONSE

FIRE

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fire

- Dry chemical, CO₂, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- **Do not use straight streams.**
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

OSHA Brief

Hazard Communication Standard: Safety Data Sheets

The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), revised in 2012, requires that the chemical manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) (formerly MSDSs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards. The information contained in the SDS is largely the same as the MSDS, except now the SDSs are required to be presented in a consistent user-friendly, 16-section format. This brief provides guidance to help workers who handle hazardous chemicals to become familiar with the format and understand the contents of the SDSs.

The SDS includes information such as the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical. The information contained in the SDS must be in English (although it may be in other languages as well). In addition, OSHA requires that SDS preparers provide specific minimum information as detailed in Appendix D of 29 CFR 1910.1200. The SDS preparers may also include additional information in various section(s).

Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices, and emergency control measures (e.g., fire fighting). This information should be helpful to those that need to get the information quickly. Sections 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information, and other information including the date of preparation or last revision. The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element.

The SDS must also contain Sections 12 through 15, to be consistent with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS), but OSHA will not enforce the content of these sections because they concern matters handled by other agencies.

A description of all 16 sections of the SDS, along with their contents, is presented below:

Section 1: Identification

This section identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:

- Product identifier used on the label and any other common names or synonyms by which the substance is known.
- Name, address, phone number of the manufacturer, importer, or other responsible party, and emergency phone number.
- Recommended use of the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).

Section 2: Hazard(s) Identification

This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:

- The hazard classification of the chemical (e.g., flammable liquid, category1).
- Signal word.
- Hazard statement(s).
- Pictograms (the pictograms or hazard symbols may be presented as graphical reproductions of the symbols in black and white or be a description of the name of the symbol (e.g., skull and crossbones, flame).
- Precautionary statement(s).
- Description of any hazards not otherwise classified.
- For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity. Please note that this is a total percentage of the mixture and not tied to the individual ingredient(s).

Section 3: Composition/Information on Ingredients

This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed. The required information consists of:

Substances

- Chemical name.
- Common name and synonyms.
- Chemical Abstracts Service (CAS) number and other unique identifiers.
- Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical.

Mixtures

- Same information required for substances.
- The chemical name and concentration (i.e., exact percentage) of all ingredients which are classified as health hazards and are:
 - Present above their cut-off/concentration limits or
 - Present a health risk below the cut-off/concentration limits.
- The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:
 - A trade secret claim is made,
 - There is batch-to-batch variation, or
 - The SDS is used for a group of substantially similar mixtures.

Chemicals where a trade secret is claimed

- A statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required.

Section 4: First-Aid Measures

This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:

- Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects, and any symptoms that are acute or delayed.
- Recommendations for immediate medical care and special treatment needed, when necessary.

Section 5: Fire-Fighting Measures

This section provides recommendations for fighting a fire caused by the chemical. The required information consists of:

- Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation.
- Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns.
- Recommendations on special protective equipment or precautions for firefighters.

Section 6: Accidental Release Measures

This section provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. The required information may consist of recommendations for:

- Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent the contamination of skin, eyes, and clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.
- Methods and materials used for containment (e.g., covering the drains and capping procedures).
- Cleanup procedures (e.g., appropriate techniques for neutralization, decontamination, cleaning or vacuuming; adsorbent materials; and/or equipment required for containment/clean up)

Section 7: Handling and Storage

This section provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of:

- Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices (e.g., eating, drinking, and smoking in work areas is prohibited).
- Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements)

Section 8: Exposure Controls/Personal Protection

This section indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. The required information consists of:

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.
- Appropriate engineering controls (e.g., use local exhaust ventilation, or use only in an enclosed system).
- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) (e.g., appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure).
- Any special requirements for PPE, protective clothing or respirators (e.g., type of glove material, such as PVC or nitrile rubber gloves; and breakthrough time of the glove material).

Section 9: Physical and Chemical Properties

This section identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

- Appearance (physical state, color, etc.);
- Upper/lower flammability or explosive limits;
- Odor;
- Vapor pressure;
- Odor threshold;
- Vapor density;
- pH;
- Relative density;
- Melting point/freezing point;
- Solubility(ies);
- Initial boiling point and boiling range;

- Flash point;
- Evaporation rate;
- Flammability (solid, gas);
- Upper/lower flammability or explosive limits;
- Vapor pressure;
- Vapor density;
- Relative density;
- Solubility(ies);
- Partition coefficient: n-octanol/water;
- Auto-ignition temperature;
- Decomposition temperature; and
- Viscosity.

The SDS may not contain every item on the above list because information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties, such as the dust deflagration index (Kst) for combustible dust, used to evaluate a dust's explosive potential

Section 10: Stability and Reactivity

This section describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability, and other. The required information consists of:

Reactivity

- Description of the specific test data for the chemical(s). This data can be for a class or family of the chemical if such data adequately represent the anticipated hazard of the chemical(s), where available.

Chemical stability

- Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.
- Description of any stabilizers that may be needed to maintain chemical stability.
- Indication of any safety issues that may arise should the product change in physical appearance.

Other

- Indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions. Also, a description of the conditions under which hazardous reactions may occur.
- List of all conditions that should be avoided (e.g., static discharge, shock, vibrations, or environmental conditions that may lead to hazardous conditions).
- List of all classes of incompatible materials (e.g., classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation.
- List of any known or anticipated hazardous decomposition products that could be produced because of use,

storage, or heating. (Hazardous combustion products should also be included in Section 5 (Fire-Fighting Measures) of the SDS.)

Section 11: Toxicological Information

This section identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:

- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact). The SDS should indicate if the information is unknown.
- Description of the delayed, immediate, or chronic effects from short- and long-term exposure.
- The numerical measures of toxicity (e.g., acute toxicity estimates such as the LD50 (median lethal dose)) - the estimated amount [of a substance] expected to kill 50% of test animals in a single dose.
- Description of the symptoms. This description includes the symptoms associated with exposure to the chemical including symptoms from the lowest to the most severe exposure.
- Indication of whether the chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA

Section 12: Ecological Information (non-mandatory)

This section provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment. The information may include:

- Data from toxicity tests performed on aquatic and/or terrestrial organisms, where available (e.g., acute or chronic aquatic toxicity data for fish, algae, crustaceans, and other plants; toxicity data on birds, bees, plants).
- Whether there is a potential for the chemical to persist and degrade in the environment either through biodegradation or other processes, such as oxidation or hydrolysis.
- Results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient (K_{ow}) and the bioconcentration factor (BCF), where available.
- The potential for a substance to move from the soil to the groundwater (indicate results from adsorption studies or leaching studies).
- Other adverse effects (e.g., environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and/or global warming potential).

Section 13: Disposal Considerations (non-mandatory)

This section provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices. To minimize exposure, this section should also refer the reader to Section 8 (Exposure Controls/Personal Protection) of the SDS. The information may include:

(Exposure Controls/Personal Protection) of the SDS. The information may include:

- Description of appropriate disposal containers to use.
- Recommendations of appropriate disposal methods to employ.
- Description of the physical and chemical properties that may affect disposal activities.
- Language discouraging sewage disposal.
- Any special precautions for landfills or incineration activities

Section 14: Transport Information (non-mandatory)

This section provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea. The information may include:

- UN number (i.e., four-figure identification number of the substance)¹.
- UN proper shipping name¹.
- Transport hazard class(es)¹.
- Packing group number, if applicable, based on the degree of hazard².
- Environmental hazards (e.g., identify if it is a marine pollutant according to the International Maritime Dangerous Goods Code (IMDG Code)).
- Guidance on transport in bulk (according to Annex II of MARPOL 73/783 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code (IBC Code))).
- Any special precautions which an employee should be aware of or needs to comply with, in connection with transport or conveyance either within or outside their premises (indicate when information is not available).

Section 15: Regulatory Information (non-mandatory)

This section identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS. The information may include:

- Any national and/or regional regulatory information of the chemical or mixtures (including any OSHA, Department of Transportation, Environmental Protection Agency, or Consumer Product Safety Commission regulations)

Section 16: Other Information

This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.

Employer Responsibilities

Employers must ensure that the SDSs are readily accessible to employees for all hazardous chemicals in their workplace. This may be done in many ways. For example, employers may keep the SDSs in a binder or on computers as long as the employees have immediate access to the information without leaving their work area when needed and a back-up is available for rapid access to the SDS in the case of a power outage or other emergency. Furthermore, employers may want to designate a person(s) responsible for obtaining and maintaining the SDSs. If the employer does not have an SDS, the employer or designated person(s) should contact the manufacturer to obtain one.

References

OSHA, 29 CFR 1910.1200(g) and Appendix D. United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), third revised edition, United Nations, 2009. These references and other information related to the revised Hazard Communication Standard can be found on OSHA's Hazard Communication Safety and Health Topics page, located at: <http://www.osha.gov/dsg/hazcom/index.html>.

Disclaimer: This brief provides a general overview of the safety data sheet requirements in the Hazard Communication Standard (see 29 CFR 1910.1200(g) and Appendix D of 29 CFR 1910.1200). It does not alter or determine compliance responsibilities in the standard or the Occupational Safety and Health Act of 1970. Since interpretations and enforcement policy may change over time, the reader should consult current OSHA interpretations and decisions by the Occupational Safety and Health Review Commission and the courts for additional guidance on OSHA compliance requirements. Please note that states with OSHA-approved state plans may have additional requirements for chemical safety data sheets, outside of those outlined above. For more information on those standards, please visit: <http://www.osha.gov/dcsp/osp/statestandards.html>.

This is one in a series of informational briefs highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

1 Chemical, as defined in the HCS, is any substance, or mixture of substances.

2 Found in the most recent edition of the United Nations Recommendations on the Transport of Dangerous Goods.

3 MARPOL 73/78 means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended

Modification of the Hazard Communication Standard (HCS) to conform with the United Nations' (UN) Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Questions and Answers

Q. What is the Globally Harmonized System?

A. The Globally Harmonized System (GHS) is an international approach to hazard communication, providing agreed criteria for classification of chemical hazards, and a standardized approach to label elements and safety data sheets. The GHS was negotiated in a multi-year process by hazard communication experts from many different countries, international organizations, and stakeholder groups. It is based on major existing systems around the world, including OSHA's Hazard Communication Standard and the chemical classification and labeling systems of other US agencies.

The result of this negotiation process is the United Nations' document entitled "Globally Harmonized System of Classification and Labeling of Chemicals," commonly referred to as The Purple Book. This document provides harmonized classification criteria for health, physical, and environmental hazards of chemicals. It also includes standardized label elements that are assigned to these hazard classes and categories, and provide the appropriate signal words, pictograms, and hazard and precautionary statements to convey the hazards to users. A standardized order of information for safety data sheets is also provided. These recommendations can be used by regulatory authorities such as OSHA to establish mandatory requirements for hazard communication, but do not constitute a model regulation.

Q. Why did OSHA decide to modify the Hazard Communication Standard to adopt the GHS?

A. OSHA has modified the Hazard Communication Standard (HCS) to adopt the GHS to improve safety and health of workers through more effective communications on chemical hazards. Since it was first promulgated in 1983, the HCS has provided employers and employees extensive information about the chemicals in their workplaces. The original standard is performance-oriented, allowing chemical manufacturers and importers to convey information on labels and material safety data sheets in whatever format they choose. While the available information has been helpful in improving employee safety and health, a more standardized approach to classifying the hazards and conveying the information will be more effective, and provide further improvements in American workplaces. The GHS provides such a standardized approach, including detailed criteria for determining what hazardous effects a chemical poses, as well as standardized label elements assigned by hazard class and category. This will enhance both employer and worker comprehension of the hazards, which will help to ensure appropriate handling and safe use of workplace chemicals. In addition, the safety data sheet requirements establish an order of information that is standardized. The harmonized format of the safety data sheets will enable employers, workers, health professionals, and emergency responders to access the information more efficiently and effectively, thus increasing their utility.

Adoption of the GHS in the US and around the world will also help to improve information received from other countries—since the US is both a major importer and exporter of chemicals, American workers often see labels and safety data sheets from other countries. The diverse and sometimes conflicting national and international requirements can create confusion among those who seek to use hazard information effectively. For example, labels and safety data sheets may include symbols and hazard statements that are unfamiliar to readers or not well understood. Containers may be labeled with such a large volume of information that important statements are not easily recognized. Given the differences in hazard classification criteria, labels may also be incorrect when used in other countries. If countries around the world adopt the GHS, these problems will be minimized, and chemicals crossing borders will have consistent information, thus improving communication globally.

Q. What is the phase-in period in the revised Hazard Communication Standard?

A. The table below summarizes the phase-in dates required under the revised Hazard Communication Standard (HCS):

Effective Completion Date	Requirement(s)	Who
December 1, 2013	Train employees on the new label elements and safety data sheet (SDS) format.	Employers
June 1, 2015* December 1, 2015	Compliance with all modified provisions of this final rule, except: The Distributor shall not ship containers labeled by the chemical manufacturer or importer unless it is a GHS label	Chemical manufacturers, importers, distributors and employers
June 1, 2016	Update alternative workplace labeling and hazard communication program as necessary, and provide additional employee training for newly identified physical or health hazards.	Employers
Transition Period to the effective completion dates noted above	May comply with either 29 CFR 1910.1200 (the final standard), or the current standard, or both	Chemical manufacturers, importers, distributors, and employers

*This date coincides with the EU implementation date for classification of mixtures

During the phase-in period, employers would be required to be in compliance with either the existing HCS or the revised HCS, or both. OSHA recognizes that hazard communication programs will go through a period of time where labels and SDSs under both standards will be present in the workplace. This will be considered acceptable, and employers are not required to maintain two sets of labels and SDSs for compliance purposes.

Q. Why must training be conducted prior to the compliance effective date?

A. OSHA is requiring that employees are trained on the new label elements (i.e., pictograms, hazard statements, precautionary statements, and signal words) and SDS format by December 1, 2013, while full compliance with the final rule will begin in 2015. OSHA believes that American workplaces will soon begin to receive labels and SDSs that are consistent with the GHS, since many American and foreign chemical manufacturers have already begun to produce HazCom 2012/GHS-compliant labels and SDSs. It is important to ensure that when employees begin to see the new labels and SDSs in their workplaces, they will be familiar with them, understand how to use them, and access the information effectively. For more information, <http://www.osha.gov/dsg/hazcom/effectivedates.html>.

Q. What are the major changes to the Hazard Communication Standard?

A. The three major areas of change are in hazard classification, labels, and safety data sheets.

- **Hazard classification:** The definitions of hazard have been changed to provide specific criteria for classification of health and physical hazards, as well as classification of mixtures. These specific criteria will help to ensure that evaluations of hazardous effects are consistent across manufacturers, and that labels and safety data sheets are more accurate as a result.
- **Labels:** Chemical manufacturers and importers will be required to provide a label that includes a harmonized signal word, pictogram, and hazard statement for each hazard class and category. Precautionary statements must also be provided.
- **Safety Data Sheets:** Will now have a specified 16-section format.

The GHS does not include harmonized training provisions, but recognizes that training is essential to an effective hazard communication approach. The revised Hazard Communication Standard (HCS) requires that workers be re-trained within two years of the publication of the final rule to facilitate recognition and understanding of the new labels and safety data sheets.

For a side-by-side comparison of the current HCS and the final revised HCS please see OSHA's hazard communication safety and health topics webpage at: <http://www.osha.gov/dsg/hazcom/index.html>

Q. What Hazard Communication Standard provisions are unchanged in the revised HCS?

A. The revised Hazard Communication Standard (HCS) is a modification to the existing standard. The parts of the standard that did not relate to the GHS (such as the basic framework, scope, and exemptions) remained largely unchanged. There have been some modifications to terminology in order to align the revised HCS with language used in the GHS. For example, the term "hazard determination" has been changed to "hazard classification" and "material safety data sheet" was changed to "safety data sheet." OSHA stakeholders commented on this approach and found it to be appropriate.

Q. How will chemical hazard evaluation change under the revised Hazard Communication Standard?

A. Under both the current Hazard Communication Standard (HCS) and the revised HCS, an evaluation of chemical hazards must be performed considering the available scientific evidence concerning such hazards. Under the current HCS, the hazard determination provisions have definitions of hazard and the evaluator determines whether or not the data on a chemical meet those definitions. It is a performance-oriented approach that provides parameters for the evaluation, but not specific, detailed criteria. The hazard classification approach in the revised HCS is quite different. The revised HCS has specific criteria for each health and physical hazard, along with detailed instructions for hazard evaluation and determinations as to whether mixtures or substances are covered. It also establishes both hazard classes and hazard categories—for most of the effects; the classes are divided into categories that reflect the relative severity of the effect. The current HCS does not include categories for most of the health hazards covered, so this new approach provides additional information that can be related to the appropriate response to address the hazard. OSHA has included the general provisions for hazard classification in paragraph (d) of the revised rule, and added extensive appendixes (Appendixes A and B) that address the criteria for each health or physical effect.

Q. How will labels change under the revised Hazard Communication Standard?

A. Under the current Hazard Communication Standard (HCS), the label preparer must provide the identity of the chemical, and the appropriate hazard warnings. This may be done in a variety of ways, and the method to convey the information is left to the preparer. Under the revised HCS, once the hazard classification is completed, the standard specifies what information is to be provided for each hazard class and category. Labels will require the following elements:

- **Pictogram:** a symbol plus other graphic elements, such as a border, background pattern, or color that is intended to convey specific information about the hazards of a chemical. Each pictogram consists of a different symbol on a white background within a red square frame set on a point (i.e. a red diamond). There are nine pictograms under the GHS. However, only eight pictograms are required under the HCS.
- **Signal words:** a single word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used are "danger" and "warning." "Danger" is used for the more severe hazards, while "warning" is used for less severe hazards.
- **Hazard Statement:** a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.
- **Precautionary Statement:** a phrase that describes recommended measures to be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling of a hazardous chemical.

Q. What pictograms are required in the revised Hazard Communication Standard? What hazard does each identify?

A. There are nine pictograms under the GHS to convey the health, physical and environmental hazards. The final Hazard Communication Standard (HCS) requires eight of these pictograms, the exception being the environmental pictogram, as environmental hazards are not within OSHA's jurisdiction. The hazard pictograms and their corresponding hazards are shown below.

HCS Pictograms and Hazards		
<p>Health Hazard</p>  <ul style="list-style-type: none"> ■ Carcinogen ■ Mutagenicity ■ Reproductive Toxicity ■ Respiratory Sensitizer ■ Target Organ Toxicity ■ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ■ Flammables ■ Pyrophorics ■ Self-Heating ■ Emits Flammable Gas ■ Self Reactives ■ Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ■ Irritant (skin and eye) ■ Skin Sensitizer ■ Acute Toxicity ■ Narcotic Effects ■ Respiratory Tract Irritant ■ Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ■ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ■ Skin Corrosion/Burns ■ Eye Damage ■ Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ■ Explosives ■ Self-Reactives ■ Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ■ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ■ Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ■ Acute Toxicity (fatal or toxic)

Q. Can I use a black border on pictograms for domestic shipment?

A. Under the revised Hazard Communication Standard (HCS), pictograms must have red borders. OSHA believes that the use of the red frame will increase recognition and comprehensibility. Therefore, the red frame is required regardless of whether the shipment is domestic or international.

Q. Will OSHA allow blank red borders?

A. The revised Hazard Communication Standard (HCS) requires that all red borders printed on the label have a symbol printed inside it. If OSHA were to allow blank red borders, workers may be confused about what they mean and concerned that some information is missing. OSHA has determined that prohibiting the use of blank red borders on labels is necessary to provide the maximum recognition and impact of warning labels and to ensure that users do not get desensitized to the warnings placed on labels.

Q. When must label information be updated?

A. In the revised Hazard Communication Standard (HCS), OSHA is lifting the stay on enforcement regarding the provision to update labels when new information on hazards becomes available. Chemical manufacturers, importers, distributors, or employers who become newly aware of any significant information regarding the hazards of a chemical shall revise the labels for the chemical within six months of becoming aware of the new information, and shall ensure that labels on containers of hazardous chemicals shipped after that time contain the new information. If the chemical is not currently produced or imported, the chemical manufacturer, importer, distributor, or employer shall add the information to the label before the chemical is shipped or introduced into the workplace again.

Q. How will workplace labeling provisions be changing under the revised Hazard Communication Standard?

A. The current standard provides employers with flexibility regarding the type of system to be used in their workplaces and OSHA has retained that flexibility in the revised Hazard Communication Standard (HCS). Employers may choose to label workplace containers either with the same label that would be on shipped containers for the chemical under the revised rule, or with label alternatives that meet the requirements for the standard. Alternative labeling systems such as the National Fire Protection Association (NFPA) 704 Hazard Rating and the Hazardous Material Information System (HMIS) are permitted for workplace containers. However, the information supplied on these labels must be consistent with the revised HCS, e.g., no conflicting hazard warnings or pictograms.

Q. How is the Safety Data Sheet (SDS) changing under the revised Hazard Communication Standard?

A. The information required on the safety data sheet (SDS) will remain essentially the same as that in the current standard (HazCom 1994). HazCom 1994 indicates what information has to be included on an SDS, but does not specify a format for presentation or order of information. The revised Hazard Communication Standard (HazCom 2012) requires that the information on the SDS be presented using specific headings in a specified sequence.

Paragraph (g) of the final rule provides the headings of information to be included on the SDS and the order in which they are to be provided. In addition, Appendix D provides the information to be included under each heading. The SDS format is the same as the ANSI standard format which is widely used in the U.S. and is already familiar to many employees.

The format of the 16-section SDS should include the following sections:

- Section 1. Identification
- Section 2. Hazard(s) identification
- Section 3. Composition/information on ingredients
- Section 4. First-Aid measures
- Section 5. Fire-fighting measures
- Section 6. Accidental release measures

- Section 7. Handling and storage
- Section 8. Exposure controls/personal protection
- Section 9. Physical and chemical properties
- Section 10. Stability and reactivity
- Section 11. Toxicological information
- Section 12. Ecological information
- Section 13. Disposal considerations
- Section 14. Transport information
- Section 15. Regulatory information
- Section 16. Other information, including date of preparation or last revision

The SDS must also contain Sections 12-15, to be consistent with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Although the headings for Sections 12-15 are mandatory, OSHA will not enforce the content of these four sections because these sections are within other agencies' jurisdictions.

Q. Will TLVs be required on the Safety Data Sheet (SDS)?

A. OSHA is retaining the requirement to include the American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) on the safety data sheet (SDS) in the revised Standard. OSHA finds that requiring TLVs on the SDS will provide employers and employees with useful information to help them assess the hazards presented by their workplaces. In addition to TLVs, OSHA permissible exposure limits (PELs), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet are also required.

Q. May the International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP) lists be used to make carcinogen classifications?

A. In the revised Hazard Communication Standard (HCS), OSHA has provided classifiers with the option of relying on the classification listings of IARC and NTP to make classification decisions regarding carcinogenicity, rather than applying the criteria themselves. OSHA believes that this will make classification easier for classifiers, as well as lead to greater consistency. In addition, OSHA has provided in non-mandatory Appendix F of the revised rule, guidance on hazard classification for carcinogenicity. Part A of Appendix F includes background guidance provided by GHS based on the Preamble of the IARC "Monographs on the Evaluation of Carcinogenic Risks to Humans" (2006). Part B provides IARC classification information. Part C provides background guidance from the National NTP "Report on Carcinogens" (RoC), and Part D is a table that compares GHS carcinogen hazard categories to carcinogen classifications under IARC and NTP, allowing classifiers to be able to use information from IARC and NTP RoC carcinogen classifications to complete their classifications under the GHS, and thus the HCS.

Q. Will the International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP) classifications be required on the Safety Data Sheet (SDS)?

A. OSHA has retained the requirement to include IARC and NTP classifications on safety data sheets (SDSs). Therefore, if a chemical is listed as a carcinogen by either IARC or NTP, it must be noted on the SDS. Additionally, if OSHA finds a chemical to be a carcinogen, it must be noted on the SDS as well.

Q. How has OSHA addressed hazards covered under the current Hazard Communication Standard that have not been addressed by the GHS?

A. In the Notice of Proposed Rulemaking (NPRM), OSHA proposed to include hazards currently covered under the Hazard Communication Standard (HCS) that have yet to be addressed by the GHS (OSHA provided several examples: simple asphyxiants, and combustible dust) in a separate category called "Unclassified Hazards". In response to comments from the regulated community, OSHA has renamed the category to "Hazards Not Otherwise Classified (HNOC)" to minimize confusion. In the final HCS, HNOC hazards will not be required to be disclosed on the label but will be required to be disclosed in section 2 of the Safety Data Sheet (SDS). This reflects how GHS recommends these hazards should be disclosed. Chemical manufacturers and importers are expected to assess these hazards when they are conducting their hazard evaluation of physical and health hazards. A new or separate evaluation is not required. Also in the final standard, in response to comments, OSHA has removed pyrophoric gases, simple asphyxiants, and combustible dust from the HNOC hazard category and has addressed these chemicals individually (see question below for more information on each hazard).

Q. How has OSHA addressed pyrophoric gases, simple asphyxiants, and combustible dust?

A. In the revised Hazard Communication Standard (HCS), OSHA has added pyrophoric gases, simple asphyxiants and combustible dust to the definition of "hazardous chemical". OSHA has also added definitions to the revised HCS for pyrophoric gases and simple asphyxiants, and provided guidance on how to define combustible dust for the purposes of complying with the HCS.

- **Pyrophoric gases:** OSHA has retained the definition for pyrophoric gases from the current HCS. Pyrophoric gases must be addressed both on container labels and SDSs. OSHA has provided label elements for pyrophoric gases which include the signal word "danger" and the hazard statement "catches fire spontaneously if exposed to air".
- **Simple asphyxiants:** OSHA has revised the definition of simple asphyxiants that was proposed in the Notice of Proposed Rulemaking (NPRM) as a result of comments from the regulated community. In the final HCS, simple asphyxiants must be labeled where appropriate, and be addressed on SDSs. OSHA has provided label elements for simple asphyxiants which include the signal word "warning" and the hazard statement "may displace oxygen and cause rapid suffocation".
- **Combustible dust:** OSHA has not provided a definition for combustible dust to the final HCS given ongoing activities in the specific rulemaking, as well as in the United Nations Sub-Committee of Experts on the GHS (UN/SCEGHS). However, guidance is being provided through existing documents, including the Combustible Dust National Emphasis Program Directive CPL 03-00-008, which includes an operative definition, as well as provides information about current responsibilities in this area. In addition, there are a number of voluntary industry consensus standards (particularly those of the NFPA) that address combustible dust.

In the final HCS, combustible dust hazards must be addressed on labels and SDSs. Label elements are provided for combustible dust in the final HCS and include the signal word "warning" and the hazard statement "May form combustible dust concentrations in the air".

For chemicals in a solid form that do not present a combustible dust hazard, but may form combustible dusts while being processed in normal downstream uses, paragraph (f)(4) of the HCS allows the chemical manufacturer some flexibility in labeling requirements. The manufacturer or importer may transmit the label to the customer at the time of the initial shipment, but the label does not need to be included with subsequent shipments unless it changes. This provides the needed information to the downstream users on the potential hazards in the workplace, while acknowledging that the solid metal or other materials do not present the same hazards that are produced when these materials are processed under normal conditions of use.

Q: How many businesses and workers would be affected by the revised Hazard Communication Standard?

A: OSHA estimates that over 5 million workplaces in the United States would be affected by the revised Hazard Communication Standard (HCS). These are all those workplaces where employees—a total of approximately 43 million of them—could be exposed to hazardous chemicals. Included among these 5 million workplaces are an estimated 90,000 establishments that create hazardous chemicals; these chemical producers employ almost 3 million workers.

Q: What are the estimated overall costs for industry to comply with the revised Hazard Communication Standard?

A: The revised Hazard Communications Standard's (HCS) total cost, an estimated \$201 million a year on an annualized basis for the entire United States, is the sum of four major cost elements. (1) OSHA estimates that the cost of classifying chemical hazards in accordance with the GHS criteria and revising safety data sheets and labels to meet new format and content requirements would be \$22.5 million a year on an annualized basis. (2) OSHA estimates that training for employees to become familiar with new warning symbols and the revised safety data sheet format under GHS would cost \$95.4 million a year on an annualized basis. (3) OSHA estimated annualized costs of \$59 million a year for management to become familiar with the new GHS system and to engage in other management-related activities as may be necessary for industry's adoption of GHS. (4) OSHA estimated annualized costs of \$24.1 million for printing packaging and labels for hazardous chemicals in color.

Q: What are the estimated benefits attributable to the revised Hazard Communication Standard?

A: OSHA expects that the modifications to the Hazard Communication Standard (HCS) will result in increased safety and health for the affected employees and reduce the numbers of accidents, fatalities, injuries, and illnesses associated with exposures to hazardous chemicals. The GHS revisions to the HCS standard for labeling and safety data sheets would enable employees exposed to workplace chemicals to more quickly obtain and to more easily understand information about the hazards associated with those chemicals. In addition, the revisions to HCS are expected to improve the use of appropriate exposure controls and work practices that can reduce the safety and health risks associated with exposure to hazardous chemicals.

OSHA estimates that the revised HCS will result in the prevention of 43 fatalities and 585 injuries and illnesses (318 non-lost-workday injuries and illnesses, 203 lost-workday injuries and illnesses, and 64 chronic illnesses) annually. The monetized value of this reduction in occupational risks is an estimated \$250 million a year on an annualized basis.

OSHA estimates that the revised HCS will result in savings of \$475.2 million from productivity improvements for health and safety managers and logistics personnel, \$32.2 million during periodic updating of SDSs and labels, and \$285.3 million from simplified hazard communication training.

OSHA anticipates that, in addition to safety and health benefits, the revised HCS will result in four types of productivity benefits: (1) for chemical manufacturers, because they will need to produce fewer SDSs in future years; (2) for employers, in providing training to new employees as required by the existing OSHA HCS through the improved consistency of the labels and SDSs. (3) for firms engaging in, or considering engaging in, international trade.

Q. I understand that the United Nations revises the GHS every two years. How will OSHA manage and communicate changes to the Hazard Communication Standard?

A. It is expected that the GHS will be a living document and is expected to remain up-to-date and relevant; therefore further changes may be adopted on a two year cycle. Presently most of the recent updates have been clarification of text. However, OSHA anticipates that future updates of the Hazard Communication Standard (HCS) may be necessary and can be done through various rulemaking options, including:

- Technical updates for minor terminology changes,
- Direct Final Rules for text clarification, and
- Notice and Comment rulemaking for more substantive or controversial updates such as additional criteria or changes in health or safety hazard classes or categories.

Participants Manual: Chapter 6

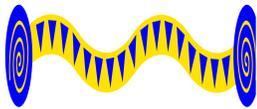
Personal Protective Equipment

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter provides an overview of Personal Protective Clothing and equipment used by First Receivers working in a healthcare environment.



Time	Instructor/Participant Ratio	Method of Instruction
.5 hours	1/30	Facilitated Seminar



Terminal Objective

At the end of instruction for Chapter 6 Student shall explain the need for types, selection criteria and limits of protective equipment commonly used in WMD/Hazmat incidents at a healthcare facility.



Enabling Objectives

This chapters enabling (performance) objectives are to ensure participants will be able to:

1. Describe the need for personal protective equipment
2. Identify Typical hazards On-Scene
3. Describe the levels of Chemical Protective Clothing
4. Describe the types of Respiratory Protection
5. Identify the Risks and Limits of Protective Clothing and Equipment
6. Identify the Criteria for selecting Protective Clothing levels

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

Res B1b 1.1.3

Develop procedures for selection/distribution of personal protective equipment (PPE)

ResB1b 2.2.1

Conduct health and safety exercises to develop and maintain appropriate knowledge and expertise for responders

ResB1b 5.2.1

Develop a PPE program as part of Health and Safety Program

ResB1b 5.3.1.1

Ensure adequate personal protective equipment is available to protect health care personnel

ResB1b 6.3

Provide required PPE



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)

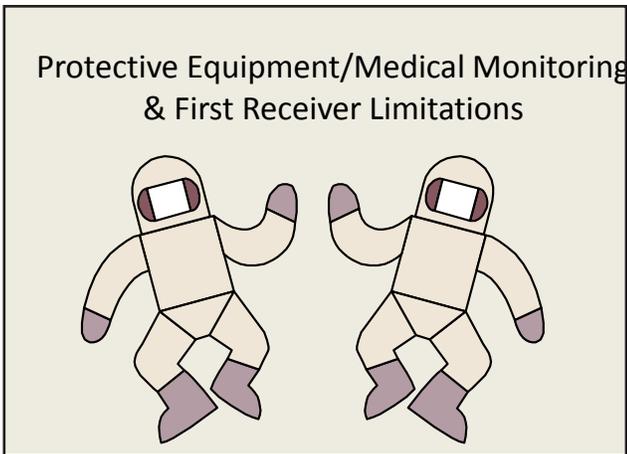


Supporting Materials

- OSHA Best Practices for Hospitals
- Hazmat Tactical Operations and Priorities

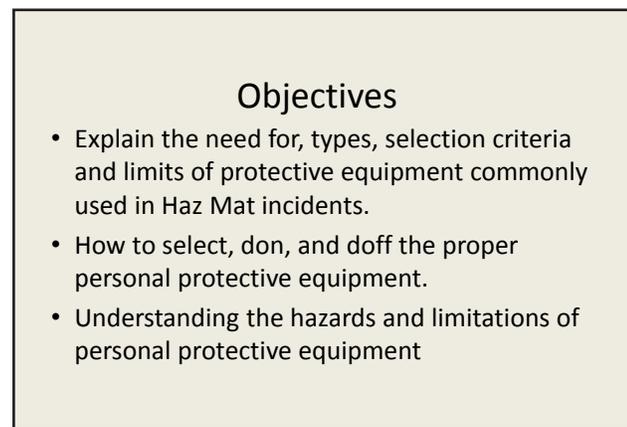
Activities

- Easel Charts for Brainstorming
- Full Dress Out



Slide 6.1

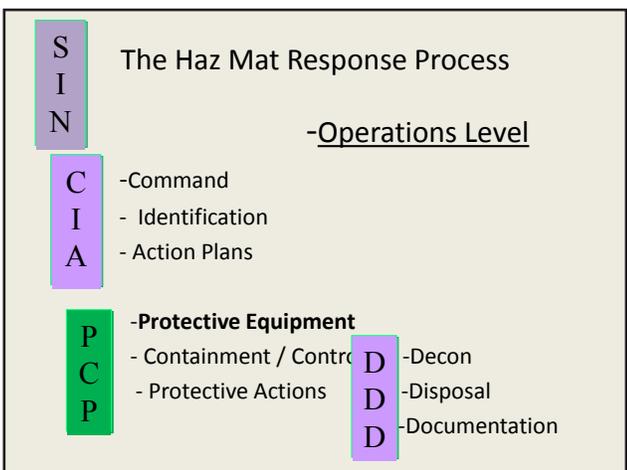
We will discuss PPE in a healthcare environment. This is different than typically used in emergency response.



Slide 6.2

There are many choices in chemical protective clothing. Each has benefits and drawbacks. This chapter will discuss the Personal Protective Equipment used in the healthcare environment where as a normal rule less contamination is expected than field responders may experience

It is important to understand how the suits go on and come off. They can be a source of injury from heat related injuries and strains. Each level of protection has its limitations that need to be understood by those who will wear them.



Slide 6.3

Remember in the Awareness class we introduced this mnemonic to remember how to address a Haz Mat incident in an organized and thorough manner.

- S - Safety
- I - Isolate and Deny Entry
- N - Notifications
- C - Command
- I - Identification
- A - Action Plans

In this chapter, we will cover the first “P” in “PCP” which is Protective Equipment.

Hazard Control or the
“Hierarchy of Controls”

- Engineering Controls
- Administrative Controls
- Personal Protective Equipment

PPE is the last and least desirable for of protection - Why?

Slide 6.4

Do not jump directly into PPE!

Use engineering controls i.e. fume hood, internal combustion - use muffler.

Admin. Controls - policy and procedures, training.

PPE - last line of defense and least desirable, puts people at risk, now you are in contact.

From Most Effective to Least Effective

1. Elimination or Substitution

substitute safe materials for hazardous ones -reduce energy; speed, voltage, sound level, force - change process to eliminate noise -perform task at ground level - automate material handling

2. Engineering Controls

ventilation systems - machine guarding - sound enclosures - circuit breakers
platforms and guard railing - lift tables, conveyors

3. Warning

computer warnings - odors - backup alarms - labels

4. Training and Administrative Controls

safe job procedures - rotation of workers - safety equipment inspections
worker training - lockout

5. Personal Protective Equipment

safety glasses - ear plugs - face shields - safety harnesses - back belts

In simplest terms the idea is to redesign the workplace to fit the needs of workers. Training workers and providing personal protective equipment is, unfortunately, necessary but to create a truly safe and healthy workplace requires substituting dangerous chemicals for less harmful ones, designing workstations to cause less harm to workers, and making the health and safety of the workplace and the environment primary concerns in workplace design.

“Let’s talk PPE”

- PPE is the last and least desirable Hazard Control option after:
 - Engineering Controls
 - Administrative Controls
- But, in “uncontrolled releases” or for managing contaminated patients it is often the only alternative.



Slide 6.5

Query class as to reasons PPE is not the preferred option

Engineering and Administrative Controls are preferable.

Increasing risk of exposure to a hazard.

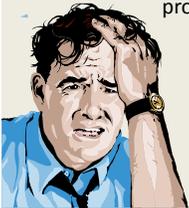
If PPE is the only protection, if the PPE fails, exposure is likely.

Use of PPE increases the potential for other risks (e.g., heat stress, slips, trips, falls, overexertion)

Don’t need if no physical contact w/product (including off gassing/vapors).

IDHA & Protective Equipment

- Need for protective equipment
- After Identification and Hazard Assessment (IDHA)
 - Determine safety of field personnel via protective equipment levels and needs.



Slide 6.6

IDHA= Identification and Hazard Assessment

Protective Equipment



- Protective Clothing
 - (Proper level)
- Respiratory Protection
 - SAR/APR
- Monitoring Devices

Slide 6.7

No one type of equipment is good against all types of hazardous materials. PPE is determined by characteristics (e.g., flammability, corrosive, toxic; vapor pressure, vapor density, specific gravity, flash point) and amount of the hazardous material. If time allows, conduct a site characterization.

Incomplete IDHA?

- Use highest level of PPE available
- Level C is lowest recommended for hospital-based patient decontamination
- In healthcare-based spills...?



Note:
Refer to
"OSHA Guidance for
Hospital-Based First
Receivers of Victims
from Mass Casualty
Incidents Involving the
Release of Hazardous
Materials"
January 2005

Slide 6.8

Discuss OSHA compilation of Interpretation Letters that articulate that OSHA recognizes that in many cases the hospital is not the site of origin of the spill and, while worker protection must be provided, level B is not always required.

PPE selection will be discussed throughout this module.

PPE is one of the limiters in the “go-no/go” process. If you do not have the appropriate PPE, you are in a “no go” situation. Refer to Appendix PIIA22 following Chapter 8.

SCBA = Self-Contained Breathing Apparatus

SAR = Supplied Air Respirator

OSHA Requirements

- Require SCBA/SAR for inhalation hazards
- FROs are FROs because of level of training and PPE



Slide 6.9

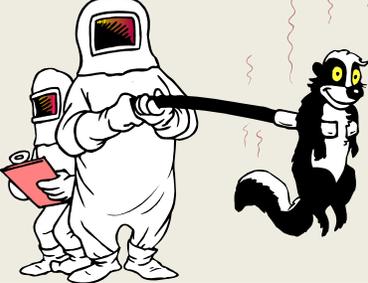
Discuss the use and abuse of PPE.

Mention not using the proper PPE or not using a complete ensemble of PPE.

The greatest chemical hazard to an unprotected responder is exposure via inhalation

Bottom Line

- PPE helps to keep you safe (if the right PPE is used in the proper circumstances)



Slide 6.10

Chemical Protective Clothing is designed to keep the bad stuff out.

Need for PPE

- Responders may be exposed
 - Inhalation
 - Ingestion
 - Absorption
 - Injection



Slide 6.11

Multiple ways to get exposed. PPE is designed to protect these routes of exposure.

Selection Criteria



- Physical form of chemical
- Degree of hazard
- Other
 - Oxygen level
 - Chemical Protective Clothing (CPC) compatibility
 - Degree of unknowns

Slide 6.12

We must first do a good identification and hazard assessment in order to select the proper clothing or decide if the equipment you have available will provide adequate protection.

“Let’s go through the litany”

- Four levels of Chemical Protective Ensemble
- Each has advantages and disadvantages
- **NO ONE ENSEMBLE IS APPROPRIATE IN ALL CIRCUMSTANCES!**
- **THESE ENSEMBLES DO NOT PROTECT AGAINST FIRE OR EXPLOSION!**
- These were not developed with healthcare in mind (more on that later).

Slide 6.13

Along with protection from chemicals there are many things these suits don’t do.

Level A		
Skin	Respiratory	Comments
Vapor Protective (also known as gas tight or fully encapsulating)	Atmosphere Supplying Respirator (Self Contained Breathing Apparatus [SCBA] or Supplied Air Respirator [SAR])	Highest level of skin and respiratory protection. Bulky, heavy, and greater potential of heat stress and Slip, Trip and Fall (STF) injuries
		

Slide 6.14

Level A is the highest form of PPE. This level provides complete vapor protection. This is seldom used in the hospital environment

Level B		
Skin	Respiratory	Comments
Liquid Splash Protection	Atmosphere Supplying Respirator (Self contained breathing apparatus [SCBA] or Supplied Air Respirator [SAR])	Lower level of skin protection with highest level of respiratory protection
	Note air supply is external to suit Minimum level of protection to enter release (hot) zone with agent unknown May be on air hose with escape bottle (SAR) SCBA limited to approximately 20 or 40 min	

Slide 6.15

Level B is considered splash protection and provides the highest form of respiratory protection. This level may be used in some hospital settings but requires the use of a Self Contained Breathing Apparatus.

Level C

Skin	Respiratory	Comments
Liquid Splash Protection	Air Purifying Respirator (APR)	Lower level of skin and respiratory protection

Filters air, does not supply air. Powered models provide higher levels of protection vs. mask type. Generally NOT sufficient for 'hot' zone if unknown substance. Cannot be used in Oxygen deficient atmospheres or Immediately Dangerous to Life and Health concentrations




Slide 6.16

Level C is the most common ensemble used in the hospital environment. It consists of splash protection with the use of an Air Purifying Respirator (APR) or Powered Air Purifying Respirator (PAPR). This is a lower level of protection than Levels A and B.



Level D

Skin	Respiratory	Comments
No chemical protection	No respiratory protection	Examples include: work uniforms, street clothes, scrubs, and Standard Precautions (provides minor chemical protection)




Slide 6.17

Level D would be your work uniform and provides little to no chemical protection.

“Let’s talk respiratory protection”
(Two basic types)

- **Atmosphere-supplying respirator** means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SAR) and self-contained breathing apparatus (SCBA) units.
- **Air-purifying respirator** means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.



Slide 6.18

Types of Respiratory Protection

Slide 6.19

SCBA		
Type/Description	Advantages	Disadvantages
<p>Self Contained Breathing Apparatus A compressed air tank (less common is a rebreather system) containing 30 or 60 minutes (usually effective for less than the rated time) of breathable air. It is mounted on a harness worn on the back with a tight fitting face piece. Weight ~ 25-40 lbs</p>	<p>An Atmosphere-supplying respirator. Greater mobility. Can be used for unknowns, in oxygen deficient atmospheres, and atmospheres above the Immediately Dangerous to Life and Health level.</p>	<p>Heavy and bulky (increased overexertion injury hazard). Limited air supply. Users must be fit tested. No facial hair allowed that interferes with mask. High level of training required. High cost.</p>
		

The Self Contained Breathing Apparatus is the most effective respiratory protection however it's size and weight makes it less desirable in the healthcare setting.

Slide 6.20

SAR		
Type/Description	Advantages	Disadvantages
<p>Supplied Air Respirators (In line system) A hose attaches the user to a hip mounted regulator that is connected by another hose to either a compressed gas tank, compressor, or piped system. The mask can be either a tight fitting mask or loose fitting hood.</p>	<p>Reduced potential of overexertion injuries. Can be configured for extended use. Loose fitting hoods do not require fit testing and can be used by persons with beards. Can place multiple responders on one system through use of a manifold system with a variety of air sources. (Thanks Howard)</p>	<p>Greater slip, trip and fall hazard from hoses. Limited range.</p>
		

NFPA 99 now states that piped air may be used for any purpose as long as it is being used for direct human consumption. So, it may be used for SARs if the system is balanced for that purpose.

Slide 6.21

APR/PAPR		
Type/Description	Advantages	Disadvantages
<p>Air purifying respirators (APR) A specialized filter attached to either a tight fitting or loose fitting afterpiece. Can be of a demand valve or powered type (PAPR).</p>	<p>A filtered air source. High mobility PAPRs are generally more comfortable than APR. Often less expensive than atmosphere supplying respirators.</p>	<p>Cannot be used for unknown substances, atmospheres below 19.5% oxygen, materials with poor warning properties, or materials present above the Immediately Dangerous to Life and Health level. Same tight fitting face piece issues as SCBA. Loose fitting hood can only be used with PAPR. Filters must be specific to type of contaminant present.</p>
		

Here are two types of Air Purifying Respirators. The one on the left is a filter only. The Powered APR on the right filters the air with a battery powered blower. The PAPR is less strenuous, more comfortable and does not have the strict fitting requirements of a mask.

FROM: Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances

TABLE 3 Practical Personal Protective Equipment (PPE) Recommended

- A PPE ensemble that includes a PAPR with a protection factor of 1000 equipped with a HEPA Organic Vapor/Acid Gas cartridge, chemically resistant protective clothing for body and head,
- Chemically Resistant Boots
- Double gloves; butyl over nitrile
- This recommended equipment to be worn by everyone whose role or function would cause them to work inside the Decontamination Zone

Note: For Decon - not necessarily for spill response

Slide 6.22 - 6.23

This program is not intended to cover all of the elements of a respiratory protection program. Each facility should have, or must implement, prior to placing individuals in Atmosphere Supplying Respirators or Air Purifying Respirators.

A loose-fitting face piece has the advantage of not requiring fit testing and can be used by persons with facial hair.

FROM: Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances

TABLE 3 SCOPE AND LIMITATIONS

1. The hospital is not the release site.^g
2. Prerequisite conditions of hospital eligibility are already met (Tables 1 and 2).
3. The identity of the hazardous substance is unknown.^h

Note: This table is part of, and intended to be used with, the document entitled OSHA Best Practices for Hospital-based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances.

ZONE	MINIMUM PPE
<p>Hospital Decontamination Zone</p> <p>All employees in this zone (includes, but not limited to, any of the following employees: decontamination team members, clinicians, set-up crew, cleanup crew, security staff, and patient tracking clerks.)</p>	<ul style="list-style-type: none"> • Powered air-purifying respirator (PAPR) that provides a protection factor of 1,000.¹ The respirator must be NIOSH-approved.⁴ • Combination 99.97% high-efficiency particulate air (HEPA)/organic vapor/acid gas respirator cartridges (also NIOSH-approved). • Double layer protective gloves.⁵ • Chemical resistant suit. • Head covering and eye/face protection (if not part of the respirator). • Chemical-protective boots. • Suit openings sealed with tape.
<p>Hospital Post-decontamination Zone⁶</p> <p>All employees in this zone</p>	<p>Normal work clothes and PPE, as necessary, for infection control purposes (e.g., gloves, gown, appropriate respirator).</p>

Work closely with Employee Health Services for baseline medical exam.

Components of SCBAs

- Face Piece
- Regulator
- Cylinder
- Harness



Slide 6.24

Components of SCBA's

Components of SARs

Supplied Air Respirators

- Face Piece or Loose Fitting Hood
- Escape bottle
- Air hoses
- Air Source (Med Air, Air Pumps, Air Compressor)

Slide 6.25

Listed at left are the components of s Supplied Air Respirator. These provided some supplied source of air and may have application in a fixed decon system.

Components of APRs

- Face Piece
- Canister
- Blower pack (PAPR)



Slide 6.26

The Air Purifying consists of a face piece and one or more filters.

The Powered Air Purifying Respirator has a blower. In combination with the loose fitting hood it provides a positive air flow inside the hood.

Respiratory Protection

- Respiratory
 - Appropriate Use and Limitations
 - If respiratory protection is being used, all participants must be enrolled in a Respiratory protections program that meets the OSHA Respiratory Standard
 - For example:
 - Maintenance and care
 - Fit testing (not required if using loose fitting face piece.)
 - Medical Clearance

Slide 6.27

A respiratory protection program is an employer requirement.

Problems with PPE

- Heat Stress
- Slips / Trips / Falls
- Overexertion (strains and sprains)

Slide 6.28

There are a number of problems associated with the wearing and use of Personal Protective Equipment.

PPE Risks and Limits

- Penetration
- Degradation
- Permeation



Slide 6.29

Penetration- the passage of chemicals through holes, seams, rips in the CPC

Degradation- the deterioration of the CPC from temperature, abrasion, sunlight

Permeation- the ability of a chemical to pass through CPC (refer to compatibility charts)

Chemical Protective Clothing

- Body
 - Chemical Protective Clothing
 - Compatibility (Use charts)
 - Permeation, Penetration, Degradation



Slide 6.30

Again, no one type of fabric will protect against all chemicals. Look at chemicals within a facility and the likely chemicals that may be encountered. Research chemicals used in local industry. (Check with local agency that manages hazardous materials emergency planning and community right-to-know program e.g., SARA Title III).

Permeation- a function of characteristics, concentration, and contact time. Charts are vital in determining appropriate compatibility.

Penetration is the ability to resist physical assault. Remember seams and zippers.

Degradation is how the material deteriorates over time when exposed to heat, cold, light, etc. (Example: ask class if anyone has a vehicle over 10 years old. What condition is the dashboard?) Most Chemical Protective Clothing has an approximately 5 year shelf life if under controlled temperatures.

Inspection Procedures

- Before Wearing Any Chemical Protective Clothing & Equipment (CPC&E) It Should Be Properly Inspected
 - Create a Checklist for Visual Inspections
 - Suit Should Be Inspected Immediately Before Use
 - Monthly When Not in Use

From FEMA Noble Training Center HERT MCI WMD

Slide 6.31

PPE must be inspected on a regular basis and prior to use to insure it is in a serviceable condition.

Inspection Procedures

- Spread suit out on a flat surface
- Examine the outside for the following:
 - Fabric for abrasions, cuts, holes, or tears
 - Fabric has retained the original flexibility and durability
 - Seams for separation or holes
 - Zippers, buttons, storm flaps, and other connecting devices for proper sealing and operation

Slide 6.32

Find an area to lay out suit.

Inspection Procedures (cont'd)

- Inside a dark room:
 - Use flashlight inside of the suit
 - Look for pinpoints of light from outside the suit
- Refer to manufacturer's recommendations for:
 - Routine, and/or
 - Special inspection procedures

Slide 6.33

Inspect Respirator Equipment

- Components
 - Face-piece
 - Breathing tube
 - Hood
- Cartridges
- Belt and snaps
- Cleanliness
- Batteries
 - Flow check (4-6 cfm)



Slide 6.34

Look for cracks, tears, loose connections, low battery power and cleanliness

Pre-Donning

- Hydrate
- Urinate
- Remove anything you want to see again or that may restrict movement:
 - Jewelry (earrings, big rings, watches, bracelets, necklaces)
 - Pocket contents (wallet, keys)
- If you can change into an inner suit such as a set of scrubs or bunny suit, all the better
- Take vital signs (pulse at a minimum)

PH11A-29

Slide 6.35 - 6.36

Once the practice exercise begins you may want to use the four-page direction handout as a guide.

Referring to and turning to the handout, 6-Page Donning and Doffing Procedure in the back of this chapter, here will ensure all the students know it exists and how it can help to keep the process on track.

Suit Fully Donned



This suit is commonly used in a healthcare setting.

“The Law of Unintended Consequences”

- The primary **hazards** of wearing PPE:
 - **Heat Stress**
 - Slips / Trips / Falls
 - Overexertion (strains and sprains)



Slide 6.37

Heat Stress - kills emergency responders, the biggest hazard, when you go into PPE, you compromise your body's ability to regulate your heat, your ability to sweat and evaporation, sweat helps to cool your body, you must pre hydrate.

Items that cause you to dehydrate (diuretics) caffeine, alcohol, some medications.

Use H2O or an electrolyte drink - water is preferred. HazMat team drinks 3 liters of water before

donning PPE.

Do Not don PPE if you are feeling ill, especially if running a fever check pulse, b/p, wt before and after.

Slips/trips/falls - your ability to see is decreased, product itself can be slippery and cause a hazard, slick surfaces are created in decon.

Overexertion - lifting, pulling, holding patients, know how you personally adapt to an enclosed environment, going thru this class does not mean you are use to it, it takes time, know your limitations, heat stroke is life threatening and your body is overwhelmed

Personnel Monitoring and Medical Surveillance

- Base Line - pulse, temperature, (BP, weight)
- Exit
- Medical Surveillance (Employee Health Services)

Slide 6.38

Pulse rate is the single most important factor. Take and record pulse prior to entry. Take pulse after exiting. Limit activities if: pulse rate is 180 beats per minute minus age (in persons with normal cardiac performance), deep body temperature 38 degrees C (100 degrees F)- unacclimatized or deep body temperature 38.5 degrees C (101.3 degrees F)- acclimatized, worker experiences profuse and prolonged sweating, worker appears to be disoriented or confused, or suffers inexplicable irritability, malaise, or flu-like symptoms.

Heat Emergencies

Heat emergencies result from one of two primary causes: environmental (exogenous heat load when the temperature exceeds 32° C or 90° F) or excessive exercise in moderate to extreme environmental conditions (endogenous heat load). Regardless of the cause, hyperthermic conditions can lead to the following conditions: Heat Cramps, Heat Exhaustion, or Heat Stroke.

Heat Cramps most commonly occur in the patient who exercises and sweats profusely, and subsequently consumes water without adequate salt. Heat cramps most commonly involve the most heavily exercised muscles. These patients may present with normal temperature but hot sweaty skin with mild tachycardia and normal blood pressure.

Heat Exhaustion presents with minor mental status changes, dizziness, nausea, headache, tachycardia and mild hypotension. Temperatures is less than 103° F. Rapid recovery generally follows saline administration.

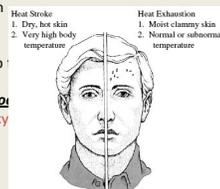
Slide 6.39

Heat emergencies occur in chemical protective clothing much quicker than normal working clothes. All receivers should keep an eye on each other for signs of a heat emergency. You are all Safety Officers in this regard.

Heat Emergencies

Heat Stroke occurs when the patient's thermoregulatory mechanisms break down completely. Body temperature is elevated to extreme levels resulting in multi-system tissue damage, including altered mental status and physiological collapse. Heat stroke usually affects the elderly patient with underlying medical disorders.

Patients with heat stroke usually have dry skin; however, up to 50% of patients with **exertional heat stroke** may exhibit persistent sweating. Therefore, the presence of sweating **does not** preclude the diagnosis. **This is a true medical emergency**



Slide 6.40

Note that recent information indicates that one can suffer heat stroke and continue to sweat.

When to discontinue work in PPE due to Heat Stress

- Sustained (several minutes) heart rate in excess of 180 bpm minus individual's (w/normal cardiac performance) age
- Body core is greater than 38.5°C (101.3°F) (38 °C for non-acclimatized workers)
- Recovery heart rate after one minute peak work effort is greater than 110 bpm
- Symptoms of sudden and severe fatigue, nausea, dizziness, or lightheadedness.
- Source: ACGIH

Slide 6.41

Pulse rate is the single most important factor. Take and record pulse prior to entry. Take pulse after exiting. Limit activities if: pulse rate is 180 beats per minute minus age (in persons with normal cardiac performance), deep body temperature 38 degrees C (100 degrees F)- unacclimatized or deep body temperature 38.5 degrees C (101.3 degrees F)- acclimatized, worker experiences profuse and prolonged sweating, worker appears to be disoriented or confused, or suffers inexplicable irritability, malaise, or flu-like symptoms.

Remove worker for rest in a cool locations with rapidly circulating air and keep under skilled observation.

If sweating stops and the skin becomes hot and dry, immediate emergency care followed by hospitalization is essential.



Hand Signals

- Hand gripping throat - Out of air, can't breathe
- Grip partner's wrist (or both hands around waist) - Leave area immediately
- Hands over head waving in circles - Need assistance
- Thumbs up - OK, I am all right, I understand
- Thumbs down - No, negative

<http://www.osha.gov/Publications/complinks/OSHG-HazWaste/Append.pdf>

Slide 6.42

- Hand out of examples of Hand Signals if you have them locally accepted.
- Duty of the Decon Group Leader and Initial Contact Unit Leader to review hand signals with the Decon Resource Team.
- Be sure they are easy to see from far away.
- Other techniques to communicate include in suit radios, whiteboards, loud hailer (bullhorns)

Donning

- Begin with the team member standing:
 - Assist with donning an inner suit, inner gloves and outer gloves
- Have the team member sit:
 - Pull the outer suit up to the knees with boots over feet – do not tape at this point
 - Wear additional disposable boot coverings or protectors, if necessary.
- Have the team member stand:
 - Pull the outer suit up and over the shoulders,
 - Tape gloves to suit sleeve and boots to suit leg, then
 - Affix the PAPR power unit belt to waist
- Have the team member sit and await a briefing.

Slide 6.43

The addition of putting the outer gloves on at this stage was added in late 2008 and has worked well for all that use the technique.

The last bullet was also added at the same time and is a critical link to the HICS and the whole decon command structure of assuring Decon Team members ALL have the most recent updates on the situation and fully understand their jobs before entering the Decon Corridor.

Waiting For Briefing



Slide 6.44

Keep workers in a cool shaded location. They can over heat very easily with little or no physical activity

Donning

- When directed have the team member stand:
 - Turn the PAPR motor on and place the hood over the head tucking inner cowling into suit collar
 - Zipper suit tight and ensure tape/Velcro seals the zipper flap
 - Place team member's name and position on tape affixed to the PPE suit, not the PAPR, usually on the arm or upper leg
- Place the belt buckle in the center of the waist and ensure the wearer can easily access that buckle for emergency purposes.
- Helper should observe wearer for a short period of time to be assured that the wearer is comfortable and the equipment is functioning properly.

Slide 6.45

We usually suggest that the donning assistant hold the hood in front of the Decon Team member so that he or she can hear and feel the air flowing before the hood is placed over the head.

The last bullet is critical for the donning assistant to do to ensure the Decon Team member is comfortable and all the parts of pieces of the PPE are in place and working properly.

We suggest the Haz Mat Assistant Safety Officer as

the final authority for approving entry into the Decon Corridor.

Doffing

- Doffing team members
 - Suited in Standard Precautions PPE - include face shield if possible
- Begin with the Decon Team Member standing.
 - Advise team member that they do not need to assist you
 - Use provided towels to remove as much water as practical from suit
 - Remove PAPR hood – turn off PAPR motor
 - Unbuckle PAPR blower unit belt and remove
 - Remove tape from boots and gloves
 - Remove outer gloves – remove with suit in next step if possible
 - Remove suit with outer gloves from shoulders down to knees – leave inner gloves on
- Have team member sit:
 - Remove boots - remove with suit in the next step if possible
 - Remove suit from legs - ONE LEG AT A TIME
 - Have team member place feet in a safe location preferably directly into provided foot ware
- Have team member stand:
 - Have team member remove inner gloves and hand them to you
 - Have team member move away from your location

Slide 6.46

As of 2009 there are major changes here. Removing the PAPR hood before any other item of PPE is the significant alteration. This change now emulates fire service haz mat protocol that ensures a quality decontamination of the responders PPE before they begin to leave the decon corridor. The answer to the question “What do the doffing assistants wear” is Standard Precautions with a splash shield if possible.

PPE Donning/Doffing

- We show you first.
- Then you do it.



Slide 6.47

Demonstration

Slide 6.48

Head, Shoulders, Knees and Toes

- Head
- Shoulders
- Knees and
- Toes and
- Eyes and
- Ears and
- Mouth and
- Nose and
- Hands



Slide 6.49

Post Doffing

- Don appropriate footwear as necessary.
- Ensure your vital signs are taken.
- Report to your Unit Leader.
- Hydrate
- Urinate
- Rehabilitate including medical monitoring.
- Debrief

Hydration cannot be emphasized enough here. The Haz Mat Assistant Safety Officer should be the position that is directly responsible for ensuring that all decon team members are cared for well.

Slide 6.50

Suit Construction

Before Buying

The interface and inter-wrist and inter-feet.

Things to look for:

- Hoods
- Cuffs
- Elastic
- Seams
- Zippers
- Sizes

Things to consider:

- Respiratory protection
- Gloves
- Boots
- Kneepads



Chemical protective clothing should be purchased that is suitable for the jobs to be performed at the healthcare facility. Here are a few things to consider.

Extremities

- Most likely to come in contact with the chemicals
 - Hands
 - Compatibility (Nitrile and butyl appropriate for most chemicals encountered in healthcare)
 - Double gloving
 - Feet
 - Compatibility
 - Steel toed/Steel Shankd if crushing or penetration hazard exists.
 - Boots, overboots, booties
 - To tape or not to tape?

Slide 6.51

Latex gloves and boot covers provide poor chemical protection and a significant number of healthcare workers have latex allergies. Nitrile is preferred.

Tape is an imperfect method for attaching boots/gloves to chemical protective clothing. Discuss pros and cons of taping. Elastic versus non-elastic (better taping).

Head, Eye and Ear Protection

- Head - If the incident presents a potential of falling objects, head protection (e.g.; hard hat) that meets the ANSI standards is indicated.
- Eyes and Ears
 - Use eye protection that meets the ANSI 1987 standard if a hazard exists
 - Use appropriate ear protection if noise level meets Action Level

Slide 6.52

ANSI - American National Standards Institute

SUIT LOG TIMES

Incident Name	Date	Time Keeper							
Name		1	2	3	4	5	6	7	8
Police Rate									
Visual Check									
Time "ON" Air (Clock Time)									
Work Time Allowance (In minutes)									
Time to get all to Cold Zone (Clock time)									
Time "OFF" Air (Clock Time)									

Suit Log Times

Air Temperature	Suiting (Radiant Heat Exposure)			
	Full Suit	Partly Suited	Shade 100%	Full Shade
70°F	Minutes Of Work	Minutes Of Work	Minutes Of Work	Minutes Of Work
75°F	30	45	60	90
80°F	20	30	45	60
85°F	15	20	30	45
90°F	15 (single work)	15	20	30
95°F	Emergency Disrupter	Disrupter	15	15

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Slide 6.53

Work Mission Duration should be estimated based on environmental and climate conditions.

- Refer to example Suit Log Time form in student manual.
- Modify to the type of PPE your using.
- Staff must be monitored during event, can't work forever in a suit.

Slide 6.54

Review

- Summary of Chapter
- Questions

Supporting Material

Donning and Doffing Procedures

Main Points

- PreDonning Procedures
- Donning Procedure
- Doffing Procedures
- PPE Donning Task List
- Safety Briefing Key Points
- Suit Log Times
- Post Doffing
- PPE DOffing Task List
- Powered Air Purifying Respirator

Donning and Doffing Procedures

For Chemical Protective Personal Protective Equipment using a
Powered Air Purifying Respirator with a Loose Fitting Hood

(Note: These are generic guidelines and may be customized to meet local needs.)

PreDonning

- Hydrate
- Urinate
- Remove anything you want to see again; or that may restrict movement or interfere with the Personal Protective Equipment:
 - Jewelry (earrings, big rings, watches, bracelets, necklaces)
 - Pocket contents (wallet, keys)
- If you can change into an inner suit such as a set of scrubs or air permeable disposable coverall, all the better
- Take vital signs (pulse at a minimum)

Donning

- Begin with the team member standing or sitting:
 - Assist with donning an inner suit, inner gloves and outer gloves
- Have the team member sit:
 - Pull the outer suit up to the knees and don boots over feet
 - Wear additional disposable boot coverings or protectors, if necessary.
- Have the team member stand:
 - Pull the outer suit up and over the shoulders, tape outer gloves and boots to suit (if necessary)
 - Zip suit half way and affix the PAPR power unit in the small of the back with belt tightened snugly at waist - drape PAPR hood over shoulder
- Have the team member sit and await a briefing.
- Keep team member cool and hydrated

- When directed have the team member stand:
 - Turn the PAPR motor on and place the hood over the head tucking inner cowling into suit collar
 - Zipper suit tight and ensure tape/velcro seals the storm flap
 - Place team member's name and position (pulse optional) on tape affixed to the PAPR or other visible location (Do not write directly on suit.)
- Place the belt buckle in the center of the waist and ensure that the wearer can easily access the battery on/off switch
- Helper should observe wearer for a short period of time to be assured that the wearer is comfortable and the equipment is functioning properly
- Ensure team member is listed on Suit Log form and has received briefing.

Doffing

- Doffing area should be located outside of the drying-dressing area in the Post-Decontamination Zone.
- Doffing Team members should be suited in Standard Precautions PPE - with a splash shield if possible.
- Begin with the Decon Team Member standing.
 - Advise the team member that they do not need to assist you
 - Use provided towels to remove as much water as practical from suit
 - Remove PAPR hood – turn off PAPR motor
 - Unbuckle PAPR blower unit belt and remove
 - Remove tape from boots and gloves as necessary
 - Remove outer gloves - remove with suit in next step if possible
 - Remove suit with outer gloves from shoulders down to knees – leave inner gloves on

Have team member sit:

- Remove boots - remove with suit in the next step if possible
- Remove suit from legs - ONE LEG AT A TIME
- Have team member place feet in a safe location preferably directly into provided foot ware

Have team member stand:

- Have team member remove inner gloves and hand them to you or in a waste receptacle
- Have team member move away from your location into the Support/Post-Decontamination Zone

PPE DONNING TASK LIST

Mission: Ensure Decon Team members are properly dressed in appropriate PPE.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Preparation Unit Leader: _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Review communication methods being used by Preparation Unit Leader.
Locate the PPE in the designated Decon Team Dressing area. Ensure all needed PPE is in your dressing station. Check the PPE for obvious defects.
Begin with the Decon Team Member sitting. It is preferred that the Team Member does not assist with donning Remove all jewelry and pocket contents of the team member and place in a sealable clear plastic bag with the team member's name visible Secure personalized bags in the pre-designated area
Ensure Team member's baseline medical monitoring is taken and recorded.
Ensure Team member is hydrated and prepared to don PPE.
Begin with the team member <u>standing</u> : Assist with donning an inner suit, inner gloves and outer gloves (if not affixed to suit)
Have the team member <u>sit</u> : Pull the outer suit up the knees with boots over feet
Have the team member <u>stand</u> : Pull the outer suit up and over the shoulders taping the gloves and boots to the suit Affix the PAPR power unit belt around the waist and secure the buckle in the middle
Have the team member <u>sit</u> and await a briefing.
When directed have the team member <u>stand</u> : Turn the PAPR motor on and place the hood over the head Place team member's name and position on tape affixed to the suit (so that it is easily visible)
Ensure, with Safety Officer, your Team member's PPE integrity and comfort level.
Report time of PAPR donning to Suit Log Time recording member.
Remain available and assist others until all team members are fully dressed in proper PPE and you are directed to another assignment by the Decon Preparation Unit Leader.
Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Preparation Unit Leader.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SAFETY BRIEFING KEY POINTS

1. SAFETY IS #1 - Observe the posted CSTI Safety Policy - No fooling around with safety!
2. Note hand signals for OK – Not OK
3. Hydrate before donning Level “C” Chemical Protective Clothing (CPC)
4. Always have a “Buddy”
5. “Buddy” is an “Assistant Safety Officer” watching for any safety problems
6. “Buddy” also to help with vitals, donning and doffing, etc.
7. Take and record vitals/medical monitoring before donning CPC
8. Follow strict “Donning” protocols/checklists – “Buddy” checks off steps!
9. “Buddy” should always watch out for heat stress and/or poor “Level of Consciousness”
10. Remember difficult to see, hear, breath and maneuver in CPC
11. Stop and remove mask if there is any problem
12. Be cautious of slips, trips and falls
13. Pace yourself, and be observant of surroundings/other students and instructors
14. Know how to properly climb ladders and be cautious
15. Notify instructors of any safety problems or injuries, however slight
16. Follow “Doffing” protocols/checklists – “Buddy” checks off steps!
17. Hydrate after doffing CPC
18. Record vitals/medical monitoring after doffing CPC – Notify instructors of any problems
19. Advise instructors of any questions, issues or problems related to safety
20. REMEMBER – SAFETY IS #1 – Any questions?

Post Doffing

- Don appropriate footwear as necessary.
- Ensure your vital signs are taken.
- Report to your Unit Leader.
- Hydrate
- Urinate
- Rehabilitate including medical monitoring.
- Debriefate

SUIT LOG TIMES

Incident Name _____ Date _____ Time Keeper _____

	1	2	3	4	5	6	7	8
Name								
Pulse Rate								
Visual Check								
Time "On Air" (Clock Time)								
Work Time Allowance (In minutes)								
Time to recall to Cold Zone (Clock time)								
Time "Off Air" (Clock Time)								

Work Time Allowances Guidelines				
Per OSHA Guidance Manual for Hazwaste Activity Table 8-10				
Air Temperature	Sunshine (Radiant Heat Exposure)			
	Full Sun Shadows 100%	Partly Sunny Shadows 50%	Full Shade No Shadows	
	Minutes Of Work	Minutes Of Work	Minutes Of Work	
70° F	60	90	120	
75° F	30	60	90	
80° F	20	30	60	
85° F	15	20	30	
90° F	15 (light work)	15	20	
95° F	Extreme Danger	Danger	15	

PPE DONNING TASK LIST

Mission: Ensure Decon Team members are properly dressed in appropriate PPE.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Preparation Unit Leader: _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Review communication methods being used by Preparation Unit Leader.
Locate the PPE in the designated Decon Team Dressing area. Ensure all needed PPE is in your dressing station. Check the PPE for obvious defects.
Begin with the Decon Team Member sitting. It is preferred that the Team Member does not assist with donning Remove all jewelry and pocket contents of the team member and place in a sealable clear plastic bag with the team member's name visible Secure personalized bags in the pre-designated area
Ensure Team member's baseline medical monitoring is taken and recorded.
Ensure Team member is hydrated and prepared to don PPE.
Begin with the team member <u>standing</u> : Assist with donning an inner suit, inner gloves and outer gloves (if not affixed to suit)
Have the team member <u>sit</u> : Pull the outer suit up the knees with boots over feet
Have the team member <u>stand</u> : Pull the outer suit up and over the shoulders taping the gloves and boots to the suit Affix the PAPR power unit belt around the waist and secure the buckle in the middle
Have the team member <u>sit</u> and await a briefing.
When directed have the team member <u>stand</u> : Turn the PAPR motor on and place the hood over the head Place team member's name and position on tape affixed to the suit (so that it is easily visible)
Ensure, with Safety Officer, your Team member's PPE integrity and comfort level.
Report time of PAPR donning to Suit Log Time recording member.
Remain available and assist others until all team members are fully dressed in proper PPE and you are directed to another assignment by the Decon Preparation Unit Leader.
Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Preparation Unit Leader.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SAFETY BRIEFING KEY POINTS

1. SAFETY IS #1 - Observe the posted CSTI Safety Policy - No fooling around with safety!
2. Note hand signals for OK – Not OK
3. Hydrate before donning Level “C” Chemical Protective Clothing (CPC)
4. Always have a “Buddy”
5. “Buddy” is an “Assistant Safety Officer” watching for any safety problems
6. “Buddy” also to help with vitals, donning and doffing, etc.
7. Take and record vitals/medical monitoring before donning CPC
8. Follow strict “Donning” protocols/checklists – “Buddy” checks off steps!
9. “Buddy” should always watch out for heat stress and/or poor “Level of Consciousness”
10. Remember difficult to see, hear, breath and maneuver in CPC
11. Stop and remove mask if there is any problem
12. Be cautious of slips, trips and falls
13. Pace yourself, and be observant of surroundings/other students and instructors
14. Know how to properly climb ladders and be cautious
15. Notify instructors of any safety problems or injuries, however slight
16. Follow “Doffing” protocols/checklists – “Buddy” checks off steps!
17. Hydrate after doffing CPC
18. Record vitals/medical monitoring after doffing CPC – Notify instructors of any problems
19. Advise instructors of any questions, issues or problems related to safety
20. REMEMBER – SAFETY IS #1 – Any questions?

PPE DOFFING TASK LIST

Mission: Ensure Decon Team Members properly remove PPE.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____

Position Reports to: Decon Preparation Unit Leader: _____

Task List

Receive appointment, briefing, and any appropriate materials.

Read this entire Task List Sheet.

Don appropriate PPE as directed by the Decon Preparation Unit Leader in consultation with the Safety Officer.

(Standard Precautions with a splash shield is usually the initial ensemble but may be modified as determined by the Safety Officer.)

Review communication methods being used by Preparation Unit Leader.

Report signs/symptoms of exposure/distress immediately to Decon Preparation Unit Leader.

Question Decon Team Member as to physical and mental condition – REPORT concerns.

If practical, have team member's footwear and other effects waiting at the PPE Doffing area.

Begin with the Decon Team Member standing.

Advise team member that they do not need to assist you

Use provided towels to remove as much water as practical from suit

Remove PAPR hood – turn off PAPR motor

Unbuckle PAPR blower unit belt and remove

Remove tape from boots and gloves

Remove outer gloves – remove with suit in next step if possible

Remove suit with outer gloves from shoulders down to knees – leave inner gloves on

Have team member sit:

Remove boots - remove with suit in the next step if possible

Remove suit from legs - ONE LEG AT A TIME

Have team member place feet in a safe location preferably directly into provided footwear

Have team member stand:

Have team member remove inner gloves and hand them to you

Have team member move away from your location and to medical surveillance.

Report time of PAPR doffing to Suit Log Time recording member.

Remain available and assist others until all team members have removed PPE.

Demobilization/System Recovery

Do not leave your post until advised to do so by the Preparation Unit Leader.

Remove your PPE carefully in place and then step into the Cold Zone area.

Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

Johns Hopkins Bayview Medical Center
 Competency Validation Tool: **Powered Air Purifying Respirator (PAPR)**

Date: _____

Employee Name: _____ Area: _____

Validated by: _____

Instructions: Circle each box as performance criteria is observed and passed.

RDN = Repeat demonstration is needed

Indicate the method of assessment using the following codes: **O** = Observation **S** = Simulation

CS = Case Study **WT** = Written Test **VT** = Verbal Test **NA** = Not applicable

Performance Criteria	Method	Date	Date	Yes	No	RDN	Comments
Criteria Met							
1. Identifies main components of system	O			Yes	No	RDN	
2. Verbalizes need to ensure black protective tabs have been removed from filter cartridge	VT			Yes	No	RDN	
3. Demonstrates connection of battery pack to turbo unit.	O			Yes	No	RDN	
4. Demonstrates activation of battery pack.	O			Yes	No	RDN	
5. Demonstrates airflow check with Airflow indicator.	O			Yes	No	RDN	
6. Verbalizes expected results of airflow indicator.	VT			Yes	No	RDN	
7. Demonstrates inspection of breathing tube for cracks, breaks, tears and other damage.	VT/O			Yes	No	RDN	
8. Demonstrates inspection of hood unit for holes, separation or tears in fabric or visor.	VT/O			Yes	No	RDN	
9. Demonstration connection of breathing tube to turbo unit.	O			Yes	No	RDN	
10. Demonstrates donning of complete system.	O			Yes	No	RDN	
11. Demonstrates removal of complete system.	O			Yes	No	RDN	

**Johns Hopkins Bayview Medical Center
Competency Validation Tool: HAZ-MAT Preparation**

Date: _____

Employee Name: _____ Area: _____

Validated by: _____

Instructions: Circle each box as performance criteria is observed and passed.

RDN = Repeat demonstration is needed

Indicate the method of assessment using the following codes: **O** = Observation **S** = Simulation

CS = Case Study **WT** = Written Test **VT** = Verbal Test **NA** = Not applicable

Performance Criteria	Method	Date	Date	Yes	No	RDN	Comments
Criteria Met							
1. Verbalizes location of HAZ-MAT policies.	VT			Yes	No	RDN	
2. Verbalizes how to prepare ambulance entrance for HAZ-MAT patient's arrival.	VT			Yes	No	RDN	
3. Identifies/assembles/locates supplies for gross decontamination of HAZ-MAT patient.	O			Yes	No	RDN	
4. Verbalizes importance of pre and post HAZ-MAT team member physical.	VT			Yes	No	RDN	
5. Verbalizes rationale for hydration prior to donning PPE.	VT			Yes	No	RDN	
6. Identifies HOT/WARM/COLD zones of decontamination	O			Yes	No	RDN	
7. Identifies and demonstrates access to water source.	O			Yes	No	RDN	
8. Demonstrates operation of HAZ-MAT tent/shower.	O			Yes	No	RDN	
9. Demonstrates donning of complete system	O			Yes	No	RDN	
10. Demonstrates removal of complete system.	O			Yes	No	RDN	
11. Verbalizes procedure for directing patients to self - decontamination area.	VT			Yes	No	RDN	
12. Verbalizes need to utilize supply list and replenish supplies as needed.	VT			Yes	No	RDN	
13. Verbalizes job classification's role and responsibility during a HAZ-MAT incident.	VT			Yes	No	RDN	

Critical Values for the Medical Monitoring Worksheet

Weight	3% Loss	5% Loss
130	126	124
135	131	128
140	136	133
145	141	138
150	146	143
155	150	147
160	155	152
165	160	157
170	165	162
175	170	166
180	175	171
185	179	176
190	184	181
195	189	185
200	194	190
205	199	195
210	204	200
215	209	204
220	213	209
225	218	214
230	223	219
235	228	223
240	233	228
245	238	233
250	243	238
255	247	242
260	252	247
265	257	252
270	262	257
275	267	261
280	272	266
285	276	271
290	281	276
295	286	280
300	291	285

Age	MHR	85% MHR	60% MHR
20	200	170	120
21	199	169	119
22	198	168	119
23	197	167	118
24	196	167	118
25	195	166	117
26	194	165	116
27	193	164	116
28	192	163	115
29	191	162	115
30	190	162	114
31	189	161	113
32	188	160	113
33	187	159	112
34	186	158	112
35	185	157	111
36	184	156	110
37	183	156	110
38	182	155	109
39	181	154	109
40	180	153	108
41	179	152	107
42	178	151	107
43	177	150	106
44	176	150	106
45	175	149	105
46	174	148	104
47	173	147	104
48	172	146	103
49	171	145	103
50	170	145	102
51	169	144	101
52	168	143	101
53	167	142	100
54	166	141	100

Vital Sign	Point at Which Responders Should Be Removed from Work
Body Temperature	> 38oC (100.4oF) - This is an OSHA requirement
Pulse	> 85% of the maximum heart rate (Maximum 220-age)
	> 110 beats per minute while the individual is at rest
Heart rate recovery	< 10 beats per minute *
Body weight loss	> 3%

Participants Manual: Chapter 7

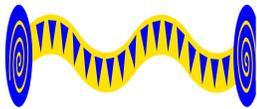
Containment, Control and Protective Actions

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter discusses some of the possible control and countermeasures that may be used in a healthcare facility and protective action options that are available to protect patients and personnel.



Time	Instructor/Participant Ratio	Method of Instruction
.5 hours	1/30	Facilitated Seminar



Terminal Objective

Student shall describe the value, method and limitations of stabilizing the Hazmat incident through safe containment: and describe the proper protective action and rescue options available to first receivers, within their capabilities and resources.



Enabling Objectives

This chapters enabling (performance) objectives are to ensure participants will be able to:

1. Describe to students All Hazmat events Eventually Stabilize
2. Identify basic Defensive Countermeasures
3. Describe Defensive “Containment” Strategy
4. Describe Offensive “Control” Strategy
5. Describe evacuation in a healthcare setting
6. Describe sheltering in place

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResB2b 7.1	Secure the contamination source and affected areas
Res B2b 7.3	Monitor status of leaks, spills and releases
ResB2b 7.3.1	Monitor clean areas within the contamination control line
ResB3a 1.3	Develop protection plans for special needs populations
ResB3a 2	Develop and implement training programs for staff involved in evacuation/ shelter-in-place implementation



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)



Supporting Materials

- OSHA Best Practices for Hospitals
- Hazmat Tactical Operations and Priorities

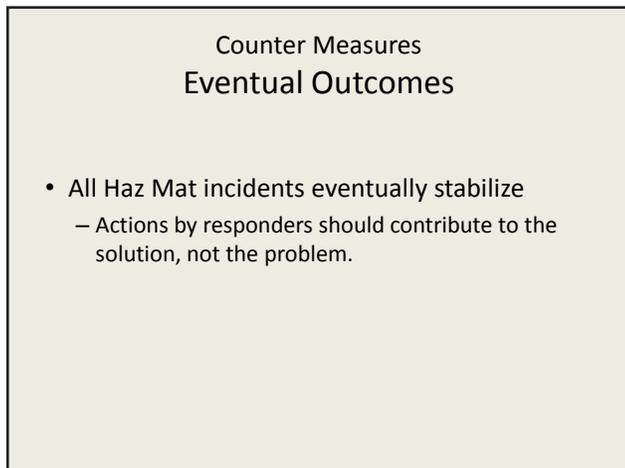
Activities

- Easel Charts for Brainstorming



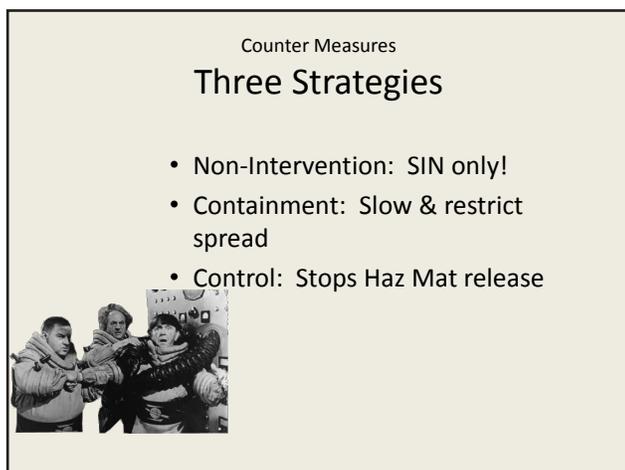
Slide 7.1

What you can and can't do.



Slide 7.2

Everything will eventually stabilize. But how long will it take? Are there things that can be harmed while you are waiting? But if no one is in danger and it will take care of itself (i.e. the ventilation system will take it out of the air) - why put yourself in danger to take care of something that can take care of itself?



Slide 7.3

Technicians and specialists implement control measures, FRO's do containment.

Counter Measures

When Not to Intervene

- Action would be unsafe
- No threat to life
- Lack of response resources
- Lack of proper PPE



Slide 7.4

Considerations when developing the Incident Action Plan, sometimes it is best not to intervene.

Counter Measures

Why Non-Intervention?



- Responders are there to save, not risk lives!
- Any level of responder can follow this strategy

Slide 7.5

A spill in the ICU versus a spill in a medical office building. Which has the greatest potential to cause harm? Who is at risk? If the best thing is to SIN and call a cleanup contractor, then nonintervention may be the best option.

Counter Measures

Defensive “Containment” Strategy Defined

Safe actions to deal with the spread of hazardous materials

- Restrict
- Slow
- Redirect

Slide 7.6

These are measures that can be taken at the FRO level.

Counter Measures

Methods of Containment

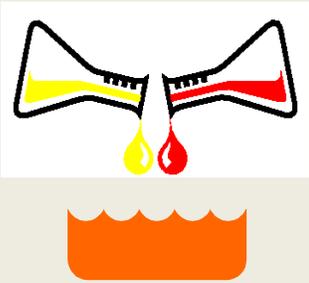
- Divert > decon runoff
- Damming > close off room
damming storm drains
- Diking > place absorbents by door

Slide 7.7

Again, FRO level actions

Methods of Containment

- Dilute

An illustration showing two beakers, one containing yellow liquid and the other red liquid, pouring their contents into a larger container below. The container is partially filled with orange liquid, representing dilution.

Slide 7.8

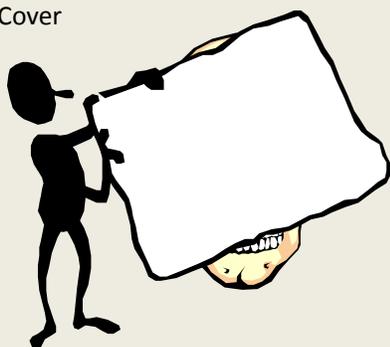
There is an old saying:
“the solution to pollution is dilution”.

This saying is not as true today, but the concept still has some merit.

Sometimes flushing something down the sink with lots of water works. This may work with the decon runoff water. Always check with the health official.

Methods of Containment

- Cover

An illustration of a person in silhouette covering a spill on the floor with a large white sheet. The spill is depicted as a yellowish-brown puddle.

Slide 7.9

Neutralizer pads. With powders if you cover them you can prevent them from becoming airborne. You reduce the surface area that is exposed to air when you cover it.

What do we have in hospitals that are absorbent on one side and solid on the other side? Chux

Control vs. Containment

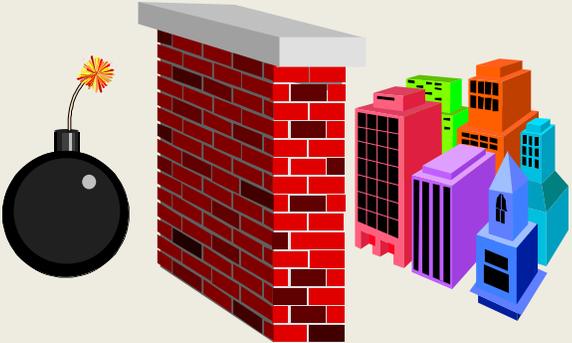


- Responders must know the difference
- Potential for contact with material?
 - It's "control"
- Control requires PPE

Slide 7.10

Technicians and specialists implement control measures. FRO's do containment. But sometimes you can prevent an incidental spill from becoming an emergency incident. Need to use common sense. This is often a gray area.

Protective Actions (P)



Slide 7.11

There are two Primary types of Protective Actions

Protective Actions



- Evacuation
- Sheltering in Place or In-Place Protection

Slide 7.12

Usually the two options in this section are Sheltering in Place and Evacuation.

Protective Actions

Evacuation

- Purpose of “Evacuation”
 - Remove people from threatened area to a safe area.
- Difficult in hospital setting

Slide 7.13

Purpose of “Evacuation” is to remove people from threatened area of hazard to safe area of refuge (evacuation shelter). Very difficult to evacuate hospital patients. Discuss problems of evacuation with class.

Protective Actions

Shelter in Place/In-Place Protection



- Purpose —
 - Keep people inside protective structure.
- May be only practical protective action.

Slide 7.14

Shelter in Place is sometimes the only practical solution. Would be used if a toxic plume was going to float over the hospital. Is used when there is little warning time (don't have time to evacuate). i.e. the hospital is next to a pool - what if they were to have a chlorine leak? No time to get out. Or what if your facility is next to a freeway and there was a haz mat accident.

If the incident is of short duration (the plume is only going to be over the facility for 30 minutes). Evacuation is not feasible.

With Shelter in Place - you would shut down the HVAC system to prevent vapors or gases from getting into the hospital. When the HVAC system is shut down it will affect other areas in the hospital such as surgery and isolation rooms. Also need to secure the doors (ingress/egress control), don't want people coming in and out. Newer hospitals generally have less infiltration. How is the HVAC system shut down? Does someone have to go on the roof?

Can I handle this Incident?

Slide 7.15

This is a discussion of the “go-no/go” quandary.

If not, what do I do?

Internal actions:

- Evacuate
 - Smoke compartments
 - Relocation of non-ambulatory patients
- Shelter in Place / In-Place Protection
 - HVAC
 - Ingress/egress
 - Utility system

Slide 7.16

Smoke compartments are designed to isolate smoke and fire and use separate air handling units. These same smoke compartments can be used to move people away from the site of the spill. Always move horizontally before moving vertically.

If you have sheltered in place and keep opening the doors to let people in and out (ingress and egress) then the benefits of in-place protection are defeated.

External actions:

- Limit and direct access
- Determine resources:
 - How to access
 - How long will it take?

Slide 7.17

Discuss using Security to control ingress, coordinating with local Law enforcement, number of exits in the facility, directing arriving folks to an area near ED/decon to determine who is in need of treatment.

Remember that when people are frightened and have few options, they can become irrational. Best to provide alternatives “You can’t come in here. But you can go there.”

- Access local emergency response system
 - Law enforcement
 - EMS
 - Fire
- Access support services (Consider time and capabilities)
 - OES
 - Environmental Health
 - Local Haz Mat contractor

Slide 7.18

Need more help:

Law - will need them to help secure the facility and control the situation.

OES - (Office of Emergency Services) they have additional fire, law, haz mat, medical resources if the county needs more help.

Fire - can help with securing situation, decon, haz mat entry, rescue.

Environmental health - technicians, assessing contamination.

Haz Mat contractor - private company such as Safety Kleen/ Clean Harbors, Patriot.
Will do clean up, do not decon people. Removal of waste.

What is available? How long will it take to get here? Are they tied up at another site of the emergency?

- Defense vs. Offense**
- What can I do as a FRA/FRO/Tech?
 - What will happen if I do nothing?

Slide 7.19

Review of Defensive actions verses Offensive actions.

Standard Operating Guidelines

- Policies, Procedures, Guidelines
- Safety Manual
- Disaster (Emergency Management) Plan
 - Example: Management of the Contaminated Patient
- What happens if you need to deviate from the plan?

Slide 7.20

Have to have policies and procedures.

Need to follow P & P's We recommend Guidelines rather than strict protocols (Kinda like the Pirates Code.)

But if you have to deviate from the P & P's need to document it in your Action Plan. Just have a good rationale. You can plan for every event, but what happens in real life will be different.

Media Implications

- Penal Code 409.5
 - Media has the right to be present (within limits)
- PIO
- Rumor Control (Internal and External)

Slide 7.21

The media are going to be there. Use them to your advantage. Control their access. 409.5 is the California code that addresses the media's access. Each state will have their own. The PIO (Public Information Officer) needs to be the one who interacts with the media. Need clear, concise information for rumor control.

Your Action and Safety Planning



Small Group
Activity
Labor In Vain +

Slide 7.22

Use small scenarios to talk about safety and response actions. These are small vignettes that highlight different aspects of hazardous materials emergency response at the hospital. Break the class into groups and hand them one scenario for each group. Have them discuss the scenarios among themselves and report back to the class.



Slide 7.23

Quick review of chapter
Ask for questions.

Supporting Materials

Haz Mat Release Countermeasures: (C.)

Protective Actions: (P)

Main Points

Review of the Basics

All Haz Mat Events Eventually Stabilize

Nonintervention Strategy

Defensive “Containment” Strategy

Offensive “Control” Strategy

Shelter in place vs. Evacuation

General Tips and Technique

Block Outline

Countermeasures

1. Review of the Basics.
 - a. Responders/Receivers' goal: Protect life, environment and property.
 - b. Know the 29 CFR 1910.120(q) and Title 8 CCR 5192(q) definitions for FRO, Technician and Specialist.
 - c. The role of any Haz Mat Responder/Receiver: Safely and competently respond within level, resources and capabilities.
 - 1) First Responder/Receiver Operations actions (S.I.N.C.I.A.P.C.P.D.D.D.) within safety and resource capabilities.
 - d. Block focus on "C" — Containment.

2. All Haz Mat Incidents Eventually Stabilize.
 - a. Responders/Receivers should contribute to the solution, not the problem!
 - 1) Remember the baseline question: What if I didn't intervene?
 - 2) Next: Will my intervention help?
 - b. Two basic FRO response actions:
 - 1) Containment — dealing with the release.
 - 2) Protective Actions — dealing with patients and the public.
 - c. Three strategies to stabilize a Haz Mat event:
 - 1) Nonintervention: No direct actions other than S.I.N.
 - 2) Containment (Defensive): Slow & restrict Haz Mat spread.
 - 3) Control (Offensive): Stop Haz Mat release.
 - 4) Move from No Fight, to Defensive, to Offensive when level, resources & capabilities of responders/receivers are in line with strategy.

3. Nonintervention Strategy.

- a. Nonintervention defined as: No direct action taken to stop, slow, contain or restrict release.
- b. When to not intervene?
 - 1) Actions would be unsafe,
 - 2) No threat to life,
 - 3) Lack of resources,
 - 4) Lack of proper PPE.
- c. Why no intervention? (Responders/Receivers are to save, not risk, lives.)
- d. Who can follow nonintervention strategy? (Anyone!)
- e. Typical method of nonintervention:
 - 1) Isolate and deny entry.
 - 2) Retention (e.g. let collect in natural low area or sump).

Countermeasures Selection Process Priorities.

<i>Safety:</i>	Ensure responder/receiver safety via protective clothing and control zones. (IC does this.)
<i>Nonintervention:</i>	Isolation and deny entry only. (FRA/FRO can do this.)
<i>Containment:</i>	Prevent the spilled material from spreading further. (FRO/Tech/Specs can do this.)
<i>Control:</i>	Stop the leak at or near the source. (Tech/Specs do this.)
<i>Recover:</i>	Clean up the spilled material. (Specialized personnel/companies do this.)
<i>Process:</i>	Think Safety! Isolate and deny entry. Do Risk vs. Gain analysis. Select safest and least environmentally damaging option. Get ready to use Plan B!

4. Defensive “Containment” Strategy.

- a. Safe acts to restrict, slow or redirect spread of Haz Mat.
 - 1) Key FRO action to defensively protect nearby exposures.
- b. When to contain: When it’s safe and practical. (Sometimes it’s not safe and/or practical.)
- c. Why contain: Limit spread; reduce life and health risks; protect environment and property; reduce cleanup costs; limit liability.
- d. Who does containment: FROs usually do containment if safe and they have proper training and equipment. (Techs/specs also.)
- e. Typical methods of defensive containment:
 - 1) Dike (e.g. make a small curb with dirt around drain).
 - 2) Dam (e.g. build overflow dam for product that sinks in water).
 - 3) Divert (e.g. build small dike to change direction of flow).
 - 4) Disperse (e.g. apply fog spray in chlorine cloud).
 - 5) Dilute (e.g. apply water to water soluble material).
 - 6) Cover (e.g. lay salvage cover over powder spill).
 - 7) Foam (e.g. apply AFFF to large gasoline spill).
 - 8) Other: _____
- f. Practical containment tools/equipment include:
 - 1) Shovels, dump trucks, dirt, sand bags, plastic bags, plastic sheet, heavy earth-moving equipment, foam, salvage covers, absorbents, fire hose, etc.
 - 2) Presence of flammables may require use of non-sparking or intrinsically safe equipment.
 - 3) Some hazmats may react with common containment materials or common substances such as water. Consult last two ERG green-bordered pages.

Control of Hazardous Materials

- Method:* **Absorption** — To take in and make part of, or to take up and hold. Can use natural materials (e.g. dirt, sand, sawdust, diatomaceous earth, vermiculite, etc.) or man-made materials. Some sorbents are made to float on water and absorb petroleum products.
- Caution:* Some sorbents (either natural or man-made) may react with certain hazardous substances.
- Method:* **Isolation/Diverting** — Diverting material to a less environmentally sensitive area and isolating the area. Effective tactic for incidents involving slowly leaking liquids that have low volatility. Can create an area to isolate the material with dikes and dams.
- Method:* **Covering** — Something placed over or about another thing, an overlay. Cover the spilled material with plastic sheeting, tarpaulin, foam, water, etc. to prevent powders from becoming airborne or to slow down evaporation of liquids.
- Method:* **Containerizing** — To pack in containers. Place leaking drums into overpack drums, put plastic bucket under leaking pipe or valve, etc. Usually done by technicians or specialists.
- Method:* **Plugging and Patching** — A piece used to fill a hole/material used to cover a hole. Use available material or prepared tools to stop leaks from containers or pipes. Note: Closing existing valves is a method of plugging and patching. Many piping systems and cargo containers may have such systems — look for them before trying something complex.

5. General Tips and Techniques.

- a. Strategies and methods should be based on solid IDHA with valid selection criteria for strategy.
 - 1) Done safely with proper protective equipment.
 - 2) Should attempt to use safest and simplest method to get job done, in line with resource and safety capabilities.
 - 3) Should be consistent with law.
- b. Theoretically, contain as close to source as safe and practical.
- c. Key resource is a Haz Mat team.
- d. Remember — FROs usually do Containment (defensive), but on occasion may do Control (offensive) or may take a nonintervention strategy based on safety and common sense.

Containment and Control Methods Worksheet

Determine if the following methods are:

No Action (nonintervention)

Containment (defensive action)

Control (offensive action)

		Method*
Isolate	To deny entry or prevent access...	_____
Plug & Patch	A piece used to fill a hole/material used to cover a hole...	_____
Retain	To hold back, hold secure or intact (in natural low area)...	_____
Dike	A bank constructed to control or confine a liquid...	_____
Absorb/Adsorb	To take in and make part of/to take up and hold...	_____
Dam	A barrier built across a watercourse for impounding liquids...	_____
Divert	To turn aside, to turn from one course to another...	_____
Containerize	To pack in containers...	_____
Disperse	To break up, spread widely, from a fixed source evaporate...	_____
Dilute	To diminish strength by admixture...	_____
Cover	Something placed over or about another thing, an overlay...	_____
Transfer	To move to a different place or situation...	_____
Foam	A stabilized froth produced chemically or mechanically...	_____

Be prepared to defend your selection!

Participants Manual: Chapter 8

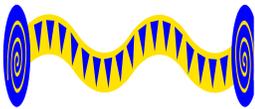
Decontamination, Documentation, Disposal

First Receiver Operations and Decontamination for Healthcare



Scope

This chapter explains how Decontamination, Disposal and Documentation occur in a hazardous materials incident at a healthcare facility.



Time	Instructor/Participant Ratio	Method of Instruction
------	------------------------------	-----------------------

1 hour

1/30

Facilitated Seminar



Terminal Objective

At the end of this chapter participants will be able to understand the principle of decontamination in a healthcare setting, the importance of proper disposal and documentation of actions.



Enabling Objectives

1. Identify the Why, When, Who and how to Decontaminate
2. Describe Emergency Decontamination
3. Identify Disposal requirements for water and contaminated objects
4. Describe the need to document actions and keep personnel exposure records

Linkages to Universal Task List

The information, objectives, and activities in this chapter promote the acquisition of knowledge and skills in support of the target capabilities identified in the Universal Task List:

ResB2b 1

Develop Plans, Policies, Procedures and Systems to Support WMD Hazardous Materials Response and Decontamination Operations

ResB2b 1.2

Develop plans, programs, criteria and protocols for conducting decon.

ResB2b 1.2.2

Develop plans, procedures and protocols to ensure individual/gross decontamination of persons prior to admittance to shelters and other mass care facilities, medical and alternate care facilities, reception centers and other places as needed

ResB2b 3.4.6

Coordinate and support clean up and disposal activities

ResB3a 2

Demobilize WMD/HazMat Response and Decontamination operations



Materials and Preparation

- Seating and work stations for up to 30 participants
- Instructor Manual and CD with PowerPoint presentation (1 for instructor)
- Participant Guide (1 for each participant)

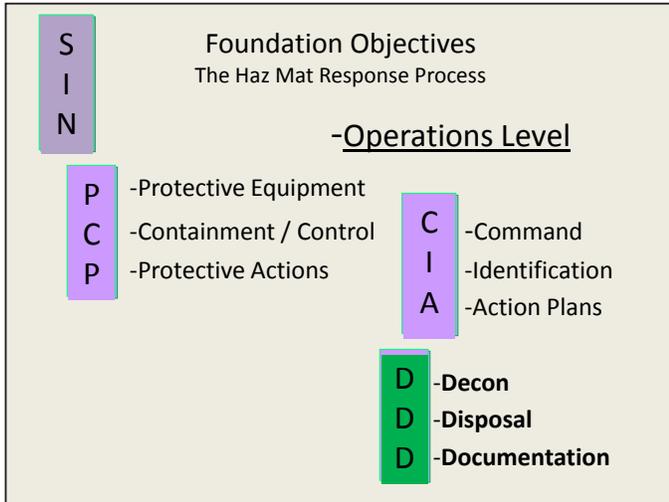


Supporting Materials

- OSHA Best Practices for Hospitals
- Hazmat Tactical Operations and Priorities

Activities

- Easel Charts for Brainstorming



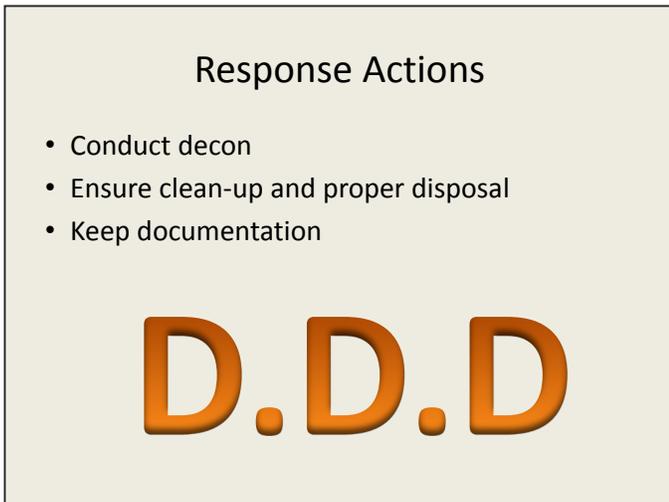
Slide 8.1

Remember the Acronym

Safety, Isolation, Notifications
Command, IDHA and Action Plans
Protective equipment; Containment and
Protective actions

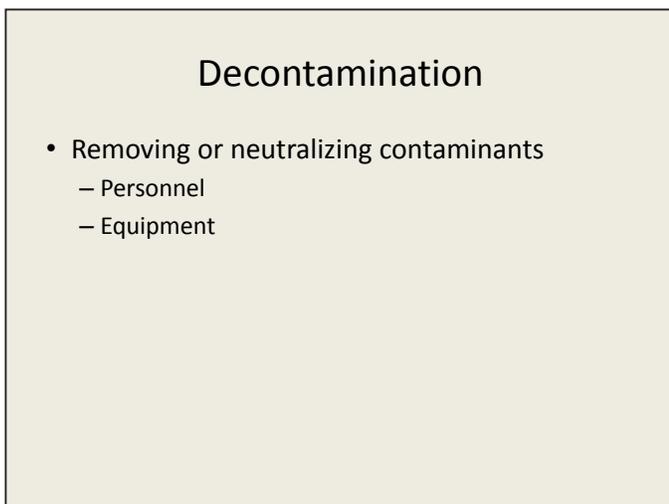
Now we will look at:

Decon, Disposal and Documentation



Slide 8.2

Note "other" FRO actions within safety and resource capabilities: Conduct Decon as needed; wait for clean-up Company and proper Disposal; and keep Documentation for later records and reports.



Slide 8.3

Our main concerns within healthcare are to provide for the safety of patients, visitors, staff, the community, and environment.

We primarily decon patients,

Types of Decon

- Responder
 - Done at the scene (hazmat team)
- Precautionary/Medical
 - Done prior to admittance to the Hospital itself
- Emergency
 - Normally done by first responders or First Receivers

Slide 8.4

Responder/Receiver – Decon of response team and equipment

Medical- A thorough decon of people prior to receiving definitive medical care. This is what hospitals conduct.

Emergency- Generally a deluge to get the contaminants off people

Note: There are many different names for different types of decon. Others may call it something else. Query the class.

Who, What, When & Why

- **Why:** Prevent escalation of problem
 - Exposure: it might be on you
 - Contamination: it is on you



Slide 8.5

Explain the difference between being exposed and being contaminated. Exposure means that there has been contact with a chemical but there is not necessarily a residual that would cause additional harm or should delay receiving treatment.

Contamination means that there is material on the victim that must be removed to prevent additional impact from the chemical, to protect staff that will

have contact with the victim, and to prevent the chemicals from spreading.

Who, What, When & Why

- **Who** usually does decon:
 - FRO's (properly trained & equipped)
 - Tech's and Specialists via Decon Team
- **How** to decon: No absolute methods
 - Only general guides

Slide 8.6

OSHA says that anyone conducting decon in a healthcare setting must be trained to the First Responder Operations level.

Only guidelines (Kinda like the Pirate's Code.) But certain key concepts apply. Protect yourself. Get the bad stuff off of the people. Getting their clothes off will get the majority of the contaminants off. Clothes off is a good start but a thorough wash is necessary. Minimize spreading the pollution but do not delay decon because of the runoff.

Degree of Contamination

- Amount of material on you
- Length of time it's on you
- Concentration of material
- Physical state of material
- Ambient temperatures



Slide 8.7

These are the things one must consider regarding the potential impacts of contamination. A number of the same issues we have addressed earlier in the class reappear. It is important for students to be able to understand and process the key issues related to decontamination. Each event will be different.

Who, What, When & Why

- **Who/What:** People & equipment
 - Victims
 - Responders
 - Equipment
 - Structures



Slide 8.8

The focus of this class is on decontaminating people and preventing internal spills from becoming a greater hazard. Equipment and structures can be addressed at a slower pace and conducted by clean up contractors. This goes back to the focus of the course which is managing an “uncontrolled release” (emergency response) versus “uncontrolled waste site” (the other parts of HAZWOPER).

Warning!

- Many hazmats are odorless, colorless and tasteless
- Acute effects may not show up immediately
- You may not be able to confirm exposure/contamination

Slide 8.9

Be cautious when assessing contamination. You must protect yourself at all times. As noted on the slide many chemicals look like water and have to odor.

Performing Decon



- Physical removal
- Chemical removal
- Emergency decon

Slide 8.10

We do physical removal.

No chemical reactions on people. Get rid of the sodium hypochlorite (bleach) for skin. (A lot of old decon techniques call for a .5% bleach solution. NO!) Bleach is OK for equipment but needs contact time and is only effective in certain circumstances.

Soap and water-yes!

Performing Decon

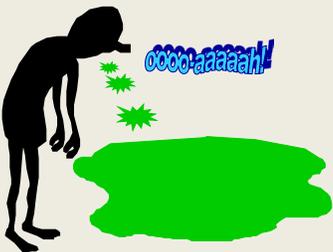


- Procedures follow logical order
- Go from “dirty” to “clean”
- Check your plan

Slide 8.11

Each facility should have a designated area for conducting decon. The location should be close to, but not immediately by, the ED. The area should be accessible at all times (e.g., not have to move cars), able to contain runoff, able to be secured, provide privacy from passersby and CNN, have lights, tepid water, heat/air conditioning.

Consequences of No Decon



- Acute/Chronic health effects
- Problem gets bigger
- Death!

Slide 8.12

Again, reiterate that getting the bad stuff off of the victim is key to everything else.

Decon

- Use copious amount of water
 - Copious = more than you have used
- Remove all clothing from victim
 - Including undergarments



Slide 8.13

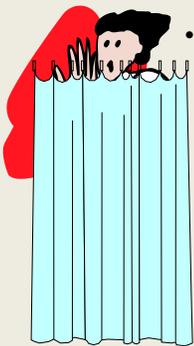
Lots of water means lots of runoff. As a fixed facility the hospital has a responsibility to not be a polluter, including runoff water. That being said do not delay conducting decon because of runoff issues. Again let us apply common sense in a healthcare setting. For example, most hospital laboratories have a deluge shower. Often that shower does not have a drain. Is it better to use that closest deluge shower in the event of a spill on a worker in the lab or strip the victim down and walk them outside to the decon

site where the water can be collected and thus avoid having many gallons of contaminated water spread throughout the facility? There is no right answer and the decision must be based on the criteria we have covered thus far.

By all of the clothes we mean all of the clothes. There is a story- we are unsure whether it is anecdotal or not, of a woman who was contaminated and was menstruating. She was wearing a pad and was understandably embarrassed to remove her undergarments; and received chemical burns in her groin since the pad was working as it should by absorbing liquids. Unfortunately the liquids can be chemicals also.

Let us continue to apply common sense. If the only contamination is that the victim stepped into the chemical, removing their footwear may be sufficient. An IDHA is key to taking the proper actions.

Emergency Decon



- Precautions
 - Avoid contact w/clothing
 - Ensure privacy of victim(s)
 - Barriers/temp garments
 - Segregate by gender

Slide 8.14

Recognize that privacy issues have become significant areas of concern. A number of organizations have regretted not providing privacy or not behaving in a professional manner. Allowing people to maintain their modesty will make a big difference in their willingness to cooperate with you when the event is occurring and minimize the headaches afterward.

When possible separate people by gender but be realistic. If parents do not want to be separated from their children do not force them to do so. Don't forget helicopters. You do not want to have video footage from above of bare buttocks from your hospital on the evening news.

Decon

- Anytime you suspect contamination
- Use common sense
 - Life risk
 - Level of exposure



Slide 8.15

We want an efficient means of getting the contaminants off of the victims. Using common sense in weighing the hazards and the appropriate actions goes back to the Identification and Hazard Assessment (IDHA) covered in the Foundation module.

Emergency Decon

- Guidelines
 - In least environmentally sensitive area
 - Clothes off
 - Water on



Slide 8.16

This is done in a field expedient mode of operation. This is done when there are signs, symptoms or grave concern for the safety of the victim. Usually done by stripping off clothing and using water. Try to do this in the least environmentally sensitive area available.

Emergency Decon

- Medical considerations
 - Decon prior to admittance
 - Protect equipment from contamination
 - Segregate contaminated material

Slide 8.17

In a hospital setting you do not want to bring contamination into the facility. Decon should be done prior to admittance to the facility.

Decon

- Water - tepid.
- Too cold - hypothermia and people will not stay in a cold shower.
- Too hot - opens pores and provides pathway for chemical to get into the body.
- Mild surfactant (Dawn, baby shampoo)
- At least a minute, preferably 3-5 minutes

Slide 8.18

Mild soap and water is best but use water if that is all that is available. Water should be tepid. This process should take several minutes to insure whole body wash.

Extreme Environments

- Very Hot and Very Cold
 - Challenges to the safety of victims and responders



Slide 8.19

If you have extreme environments be prepared with warming and cooling areas.

Cold-Hot Weather Mass Decon

- Responders should use whatever resources are available.
- Select the fastest method available.
- Decontamination is most effective when performed immediately.
- The key to successful decontamination is
 - fastest approach
 - causing the least harm
 - the most good for the majority of the people.

Information from Guidelines for Cold Weather Mass Decontamination During a Terrorist Chemical Agent Incident U.S. Army Soldier and Biological Chemical Command (SBCCOM) thanks to Jeff Rylee

Slide 8.20

Mass decon situations may require we modify our normal approach. The slide at left indicates some of the general rules in a mass decon incident.

Hypo/Hyperthermia

- Regardless of the ambient temperature, people who have been exposed to a known, life-threatening level of chemical contamination should:
 - Disrobe
 - Undergo decontamination
 - with copious amounts of high-volume, low-pressure water
 - or an alternative decontamination method.
 - Be sheltered as soon as possible.

Slide 8.21

Watch persons going through the decon process to insure they do not become hypothermic due to cold water and ambient air temperature.

Dry, dress and shelter victims as soon as possible after decontamination

Hypothermia

- A misconception among responders is that the risk of hypothermia as a result of cold weather mass decontamination is minimal.
- Risk of cold shock – less well recognized than heat.
- *Special populations, such as the elderly and the very young, should be given priority for limited resources such as blankets and indoor shelter because of limited or impaired ability to maintain body temperature.*

Slide 8.22

Caution should be taken with special populations like the elderly and children who can become hypothermic much quicker than adults.

Extreme Heat

- As indicated in the PPE module, heat stress is possibly the greatest hazard to responders/receivers due primarily to the impervious suit's compromising of the evaporation of sweat.
- Victims in high heat environments must have a means of staying cool to avoid exacerbating medical conditions and effects of chemical exposure.

Slide 8.23

Decon personnel are subject to overheating in the chemical protective clothing. Observe team members and victims for signs of heat stress.

Extreme Heat

- One of the best ways to cool victims is to
 - Get 'em wet!
- Non air conditioned decon areas can get dangerously hot during extreme temperatures.
- Consider portable or piped air conditioning.

Slide 8.24

Water is one method of cooling. Shaded areas are also helpful.

Who is a First Receiver?

Healthcare workers at a hospital receiving contaminated victims for treatment.

First Receiver Job Titles:

- Physician
- Nurse
- Administration
- Security Officer
- Phlebotomist
- Respiratory Tech
- Resident
- X-ray Tech
- Others

Koenig K. 2003. Strip and shower: the duck and cover for the 21st Century. Annals of Emergency Medicine. 42(3):391-394. September.

Slide 8.25

Who is our team comprised of? Usually requires participation from many departments to field a full decontamination team.

First Receiver Job Functions

- Triage
- Assist in Decontamination
- Post Decontamination Inspection
- Provide clinical testing, treatment and transport
- Provide direct clinical assessments and care
- Gather personal information



Close Patient Contact

Slide 8.26

There are a number of functions that must be performed along with washing patients.

Important Considerations

- **Traditional Response Site** divided into 3 functional zones – based on exposure potential.
 - OSHA used hospital-specific terminology –
 - Limited to only 2 zones
 - Decontamination
 - Post-Decontamination
- In most situations, hospitals will not know what is contaminating the victims
- Victims will arrive with little or no warning – Self Referrals – *up to 80%*

Slide 8.27

Don't get caught off guard. You may not know the contaminate on victims. They can arrive without warning at any entrance to the facility.

Important Considerations

- Victims will use all hospital entrances
- Non Ambulatory victims will take at least 2-4 times more personnel to decontaminate
- Being part of the Community Based Response Plan reduces risk to first receivers and presents problem solutions

Slide 8.28

This reality impacts your planning for the safety of security personnel.

A function of the extent of their injuries.

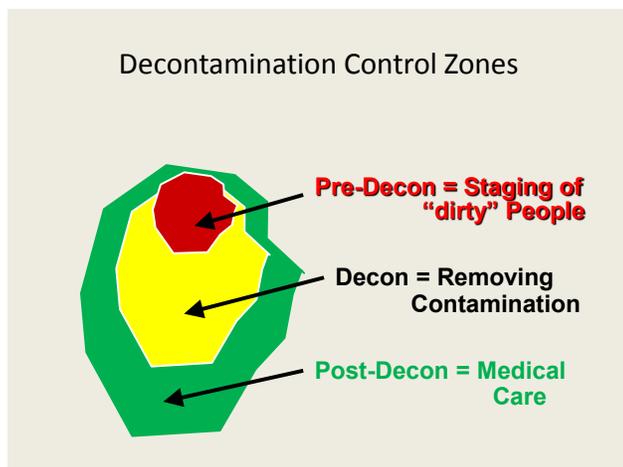
Increases the chance that your hospital will get crucial information in real time from the incident scene such as the contaminant in question.



Slide 8.29

The Hospital Decontamination Zone includes any areas where the type and quantity of hazardous substance is unknown and where contaminated victims, contaminated equipment, or contaminated waste may be present. It is reasonably anticipated that employees in this zone might have exposure to contaminated victims, their belongings, equipment, or waste. This zone includes, but is not limited to, places where initial triage and/or medical stabilization of possibly contaminated victims occur, pre-

decontamination waiting (staging) areas for victims, the actual decontamination area, and the post- decontamination victim inspection area. This area will typically end at the ED door. In other documents this zone is sometimes called the “Warm Zone.” The Hospital Post-decontamination Zone is an area considered uncontaminated. Equipment and personnel are not expected to become contaminated in this area. At a hospital receiving contaminated victims, the Hospital Post-decontamination Zone includes the ED (unless contaminated). In other documents this zone is sometimes called the “Cold Zone.”



Slide 8.30

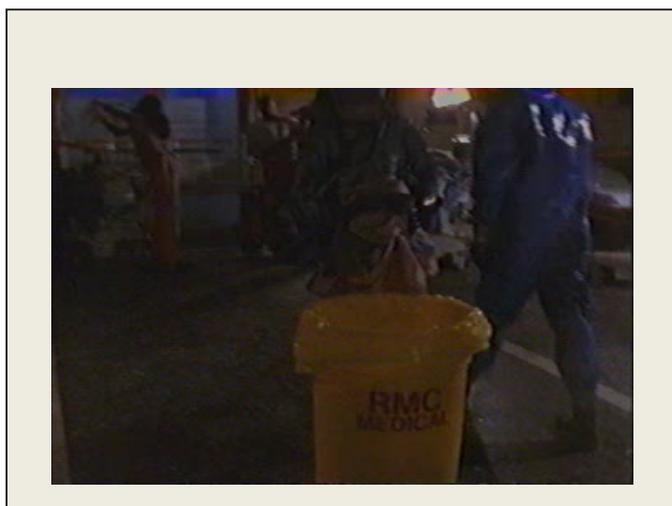
This is what they may look like. We will cover this more later.

Decontamination Zones
OSHA First Receivers

- **Pre-Decontamination Zone**
- **Decontamination Zone**
- **Post-Decontamination Zone**

Slide 8.31

OSHA doesn't use a "Pre-decontamination Zone" designation, but we do. Treat the area where the most contaminated people are being held (the Safe Refuge Area) as if it were the Hot Zone and thus where the greatest hazards exist and where the greatest precautions are taken.



Slide 8.32

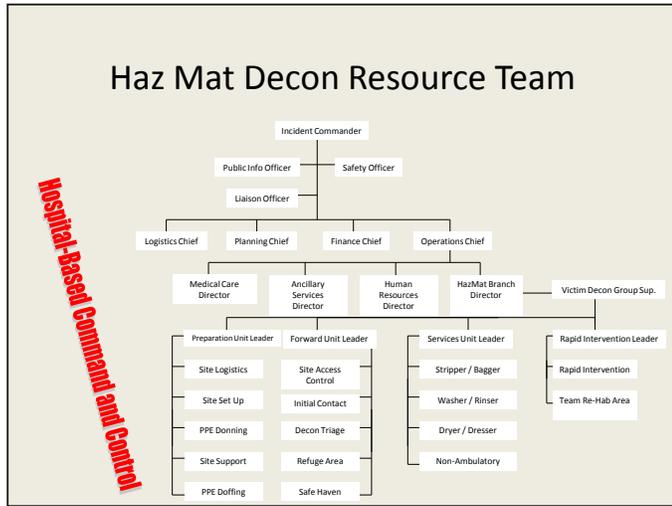
Video on Decon

ICS Haz Mat Organization

- Hazardous Materials Group Positions
 - Haz Mat Group Supervisor
 - Technical Reference
 - Assistant Safety Officer*
 - *Reports to Incident Safety Officer

Slide 8.33

Developed by the FIRESCOPE Hazardous Materials Specialist Working Group. Intended for HAZMAT teams. We went over this in the Foundation module.



Slide 8.34-35

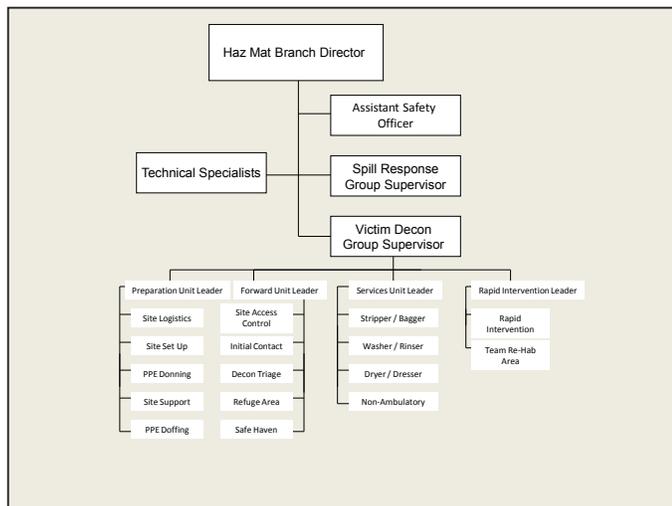
I. At the hospital we are really only doing the Decon component.
Thus the Decon Resource Team.

II. Discuss roles of these sections:

- Decon Group Supervisor
- Assistant Safety Officer
- Site Access Control
- Set Up / Support
- Initial Contact
- Triage
- Stripper / Bagger
- Washer / Rinser
- Dryer / Dresser

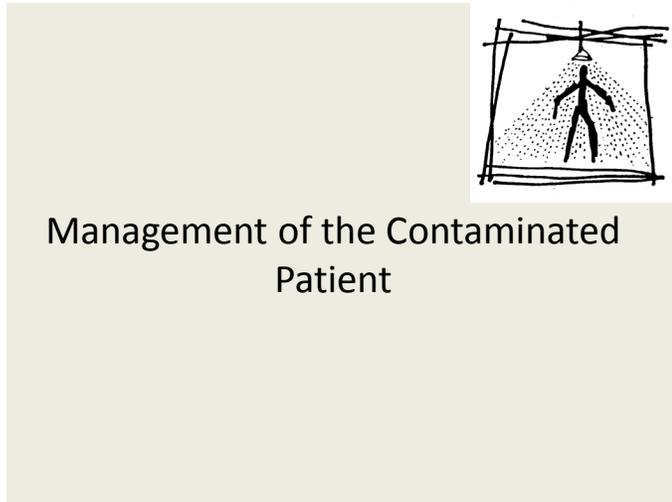
Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE and appropriate unique identifier. Level C is usually the initial ensemble.
Review communication methods being used by Services Unit Leader.
Establish and maintain visual/verbal contact with: Stripper/Bagger, Washer/Rinser and Dryer/Dresser positions.
Assume position in patient washing area especially prepared for non-ambulatory victims.
Ensure your area is prepared to accept victims that cannot walk on their own. Roller system for back boards, Gerry chairs, wheel chairs
Ensure your area has sufficient washing materials for the number of patients expected. Soap, sponges, soft brushes
Ensure your area is prepared with adequate tepid running water.
Ensure minimum three team members are available and ready to accept victims.
Call for a victim to be brought to you indicating gender if appropriate.
Disrobe victim and then physically wash entire body thoroughly.
Observe patient for any signs of stress that may interfere with complete decon.
Send victim to Dryer/Dresser area.
Ensure Dryer/Dresser is ready to accept victim.
Prepare your area and call for next victim.
In the event of PPE failure or personal distress, notify buddy and Decon Services Unit Leader. PROCEED THROUGH DECON and seek assistance.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Services Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decon.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.



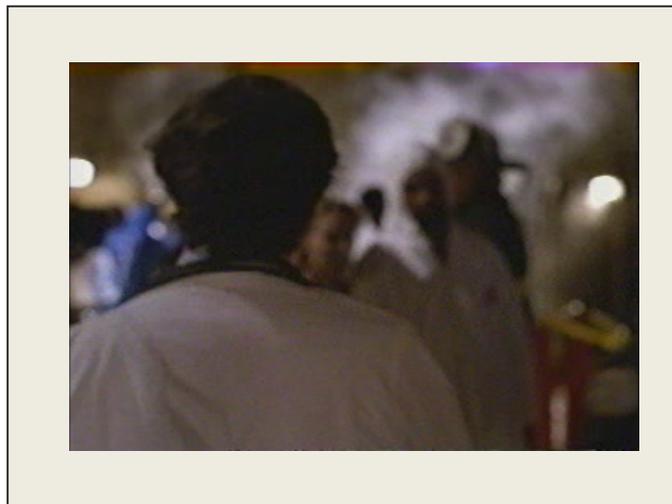
Slide 8.36

Refresh the class on the positions.



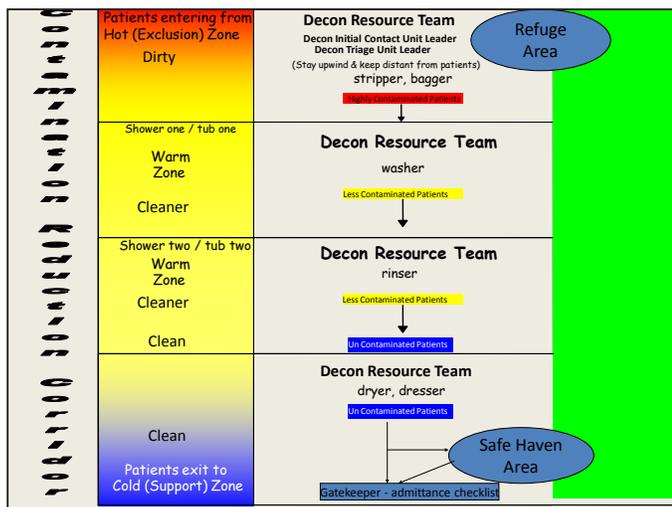
Slide 8.37

Refer back to appendix to review Management of the Contaminated Patient for more than 5 people. Take the students through the document and highlight the key points.



Slide 8.38

Video on Decon



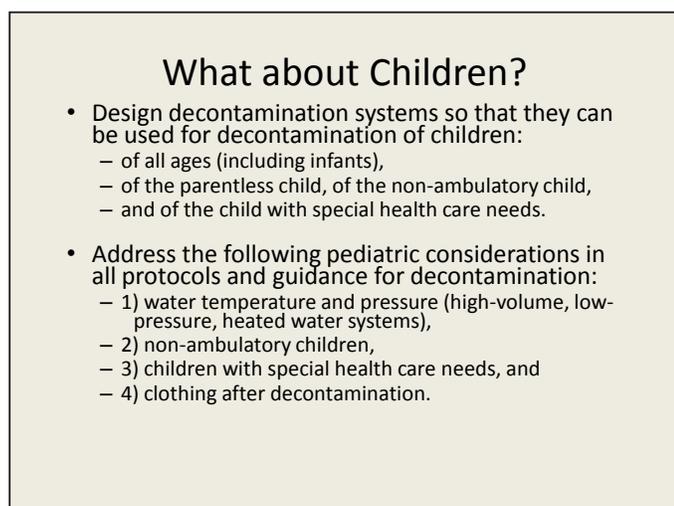
Slide 8.39

Refuge- where to hold patients prior to decon
Safe Haven- where to hold patients that have been deconned, prior to entering ED



Slide 8.40

Most facilities have tools available that may assist people through decon (non-ambulatory).



Slide 8.41

Recognize the need for addressing special needs patients – children and adults.

Query class and ask about other special needs patients. (Frail, hearing/sight impaired, language issues, hysterical)



Slide 8.42

Do not try to separate children from their parents.

Children can become hypothermic much quicker than adults.



What About Other Special Populations?

Slide 8.43

Lets talk about special needs populations!

Who are they? What types of needs may they have?

What About Your Team?

- Team members must be clean before they leave the decontamination zone
 - Stripper/Bagger = the most dirty
 - Dryer/Dresser = the least dirty
 - Washer/Rinser = the most physically at-risk
- The team must clean each other in their full PPE in the washing-rinsing area
- Start with all members gathering at the Stripper/Bagger area
 - Decon Triage assumes command of process
 - Examine each team member for physical problems
 - Determine which member should be decon'd first

Slide 8.44

This procedure is critical for the team to understand and practice well to assure safety when doffing the PAPR.

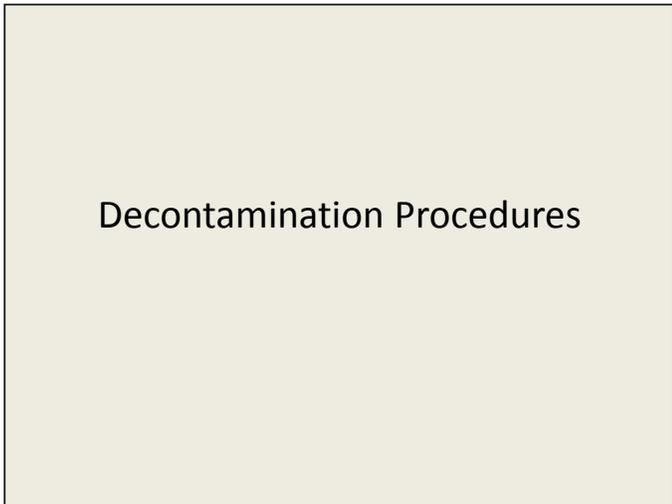
The use of the Decon Triage as Team Leader of this process is driven by the assumption that they are the most qualified of all decon team members to determine the fitness of all team members.

Goal of Team Decon

- Team members PPE has been exposed to contamination
- No team member must leave the washing-rinsing area until thoroughly cleaned
- **Safety of the team member(s) is the most important goal**
 - This includes the other members who will be assisting in doffing of the PPE

Slide 8.45

The assistants in the doffing area will be wearing Standard Precautions so will have limited protection from contaminants. If the team decon washing is done well this is not a concern.



Slide 8.46

Here are examples of field and facility decon systems



Slide 8.47



Slide 8.48

Two engines placed together to make a decon corridor.

Slide 8.49



Ambulatory victims are directed to disrobe and wash as they go through the corridor.

Slide 8.50



Non ambulatory victims will need assistance getting into the corridor, removing clothing and washing.

Slide 8.51

Mass Decon

Hospital Based

Shelter Types

- Erector Set
- Exo/Endo-skeleton
- Bounce House
- Post Office Tote

Slide 8.52

Hospital based systems may be simple to very complex.

Erector Set



Slide 8.53

Some systems require some assembly. This may happen very quickly or be time consuming based on equipment used.

Exoskeleton



Slide 8.54

These use a hard skeleton.



Slide 8.55

These type go up quickly with compressed air.



Slide 8.56

This type has a built in skeleton and is just opened up.



Slide 8.57

Along with the shelter there are other pieces of equipment that may be needed for a successful decon corridor.

Slide 8.58

Fixed, Easily Activated, Protected Decon
Facilities are the Preferred Option

Some Examples

Systems should be easy to set up and use to be most successful.

Slide 8.59

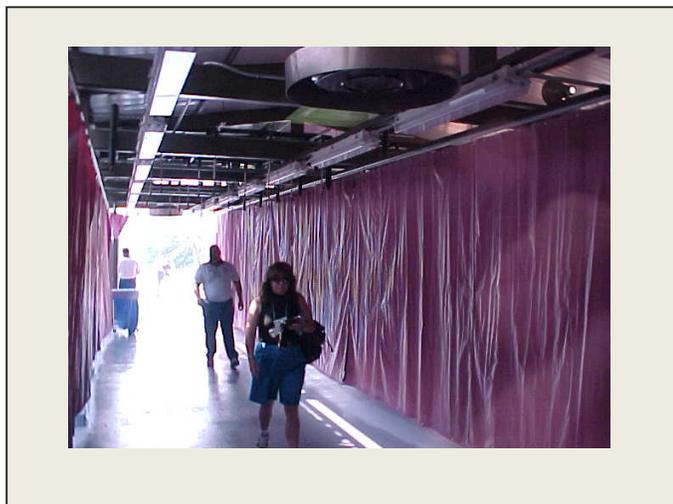
Noble Training Center

Anniston, AL

Slide 8.60

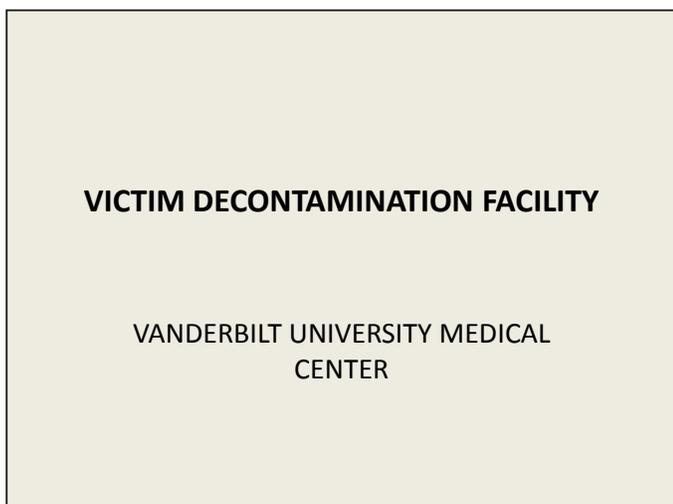


Use of existing structure modified into decon corridor



Slide 8.61

Ambulatory victims are directed to proceed through the corridor.



Slide 8.62



Slide 8.63

Circular Drive at Front of Med Ctr

Slide 8.64



Routinely used as break area. During emergency, site of decon unit.

Slide 8.65



Curtain separates male/female ambulatory decon lines

Men and Women are separated prior to clothing removal.

Slide 8.66



Water lines drop out of overhead panels.

Slide 8.67



Slide 8.68

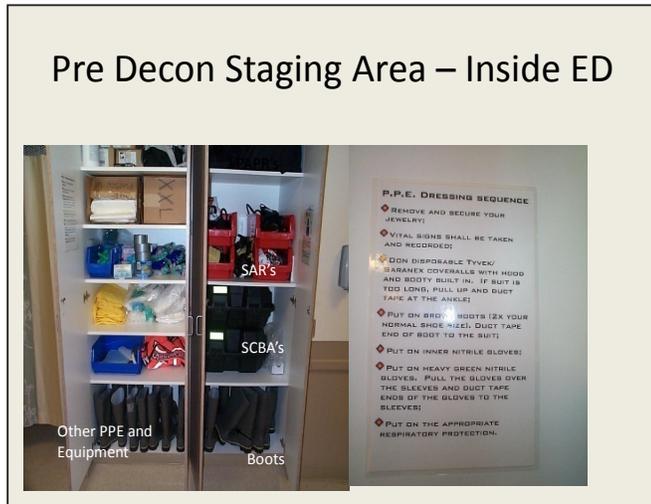
Some may need assistance through the corridor.



Slide 8.69

Non-ambulatory victims are much more labor intensive.





Slide 8.70

Equipment should be staged near where the expected use will occur.



Slide 8.71

When your done washing you will need to deal with disposal of any contaminated water and material.



Slide 8.72

Decontamination, Disposal & Documentation: (D.D.D.)

- Review of Primary FRO Actions
- Decontamination
- Minimizing Exposure and Contamination
- Why, When, Who/What and How of Decon
- Emergency Decontamination
- Decon Team Personnel, Roles and Responsibilities
- Disposal Requirements
- Funding Requirements

- Haz Mat Documentation and Reporting
- Chemical Exposure Records

Washing them away or using normal disposal methods may not be appropriate.

Reasons for Documentation

- Cost recovery
- Exposure records
- Training records
- Future lawsuits & investigations, etc.

Slide 8.73

Remember a real incident may count as part of the annual exercise requirements under the JCAHO standards, as long as other criteria are met.

Always Document!

Documentation & Reporting

- Need: get better handle on HazMat problem
 - Role of FRO in documentation
 - Capture key initial info
 - Use ICS-214



Slide 8.74

The best method to protect against litigation or fines is follow accepted procedures and document, document, document.

Components of Documentation

- Date, time and location
- Names of all response personnel
 - And exposure times!
- Incident conditions, observations and statements
- Chemical names, weather conditions, release factors

Slide 8.745

Here is some of the essential information that should be kept.

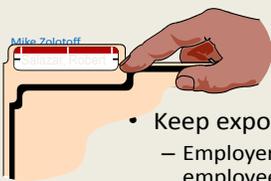
Components of Documentation

- Actions taken, resources used, costs incurred
- Casualties, sample data, etc.
- Statements & Observations of witnesses
- Diagrams, photos, video, samples

Slide 8.76

Other important information.

Chemical Exposure Records



- Keep exposure records!
 - Employer must keep for 30 years following an employee leaving the company
- All responders: Maintain your own copies of exposure records

Slide 8.77

Employees should have any exposure documented.

Post Event Monitoring

- Environmental concerns (Work with state/local/federal agencies)
 - Air/Water/Soil/Ground Monitoring
- Personnel (Work w/Employee Health Services)
 - Respiratory Monitoring
 - Chronic and Acute exposure and affects
 - Chemical Exposure Records for files

Slide 8.78

The effects of some chemical and biological exposure may have delayed onset. If exposure is suspected employees should be monitored for signs and symptoms after the incident.

Slide 8.79

Final Thought

- Don't let down guard after patients leave your area.
- Clean-up and disposal must be completed
- Documentation must be accurate and complete

Supporting Materials

Decontamination, Disposal & Documentation: (D.D.D.)

Main Points

- Review of Primary FRO Actions
- Decontamination
- Minimizing Exposure and Contamination
- Why, When, Who/What and How of Decon
- Emergency Decontamination
- Decon Team Personnel, Roles and Responsibilities
- Disposal Requirements
- Funding Requirements
- Haz Mat Documentation and Reporting
- Chemical Exposure Records

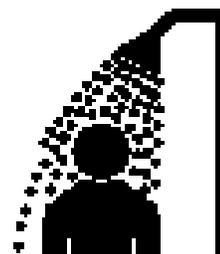
Block Outline

1. Review Primary FRO Actions
 - a. Safety, Isolation, Notifications, Command, IDHA and Action Plans, Protective equipment; Containment and Protective actions
 - b. Response actions within safety and resource capabilities:
 - 1) Conduct Decon as needed
 - 2) Ensure cleanup and proper Disposal
 - 3) Keep Documentation for later records and reports

2. Decontamination
 - a. Decon: process of removing or neutralizing contaminants from personnel and/or equipment.
 - 1) Planned decon.
 - a) Normally done by Haz Mat teams.
 - b) Primary Decon – done at the scene.
 - c) Secondary Decon – done post-incident, usually at another location (e.g. fire station). Usually done on equipment prior to returning it to service.
 - 2) Emergency decon. Normally done by first responders/receivers
 - b) At hospital or healthcare facility, should have a designated area or perform outside.

3. Minimizing Exposure and Contamination
 - a. Follow basic safety precautions
 - b. Establish and observe control zones
 - c. Ensure all responders/receivers follow above!

Decontamination



Purpose: To prevent spread of contamination

When: Anytime contamination is suspected

What: People (victims and responders/receivers), equipment, etc

How: Only general guides based on factors of the event

Decon Tips/Guides

Initial planning, training and SOPs are important.

Use a contamination reduction zone/corridor.

Use recognized good decon setup/stations.

Establish a decon team under a decon leader.

Ensure that decon team has the proper tools.

Ensure decon team observes safety guides.

Know extent of decon & need for thoroughness.

Protect decon team with proper clothing level.

Know decon procedures for medical emergency.

Remember to decon equipment & save runoff.

Practice & Train on Decon procedures.

4. Why, When, Who/What and How of Decon

- a. Why: Prevent spread of contamination/Haz Mat problem
 - 1) Exposure vs. contamination
 - a) Exposure: it might be on you
 - b) Contamination: it is on you
 - 2) Factors affecting degree of exposure/contamination:
 - a) Amount of material on you
 - b) Length of time material is on you
 - c) Concentration of stuff you're exposed to
 - d) Physical state of material
 - e) Ambient temperature

- b. When to decon: Anytime you suspect contamination
 - 1) Indications of contamination:
 - a) Material is visible
 - b) Victim(s) complains of pain, odor, etc.
 - c) Victim(s) was/were in area of a known release
 - d) Warning: many hazardous materials are odorless, colorless, tasteless and their acute effects may not show up immediately. You may not be able to confirm contamination. If in doubt, decon!

4. Why, When, Who/What and How of Decon (cont.)

- c. Who/What should you decon?
 - 1) Victims,
 - 2) Responders/Receivers and
 - 3) Equipment.

- d. Who usually does primary decon?
 - 1) FROs (properly trained and equipped).
 - 2) Hazmat Technicians and Specialists on a Haz Mat Team.

- e. How to perform primary decon
 - 1) No absolute methods
 - 2) Only general guides
 - a) Physical removal
 - b) Chemical removal
 - c) Emergency decon
 - 3) Procedures follow a logical order of going from “dirty” (i.e. contaminated) to “clean” (i.e. uncontaminated)
 - a) Check your emergency response plan for further details.
 - 4) Protective clothing for planned decon
 - a) Same level as entry team or,
 - b) One level below that of entry team
 - c) Decision depends on degree of hazard, amount of contamination and potential time of exposure

- f. Consequences of no decon/improper decon
 - 1) Acute/Chronic health effects
 - 2) Spread of problem
 - 3) Death!

5. Emergency Decontamination

- a. FROs should perform emergency decontamination anytime they suspect contamination. Consider life risk, level of exposure/skin contact, time, location, decon resources, etc.
- b. Guidelines for emergency decon.
 - 1) Move victim to least environmentally sensitive area.
 - 2) Flush with copious amount of water, or soap and water.
 - 3) Remove all contaminated clothing (including underwear) and continue flushing with water.
 - 4) Avoid the following:
 - a) Brushes and abrasives: can produce skin lesions that allow further contamination.
 - b) Hot water: promotes peripheral vasodilation and can increase absorption of toxins.
 - c) Decon solutions: can cause drastic changes in pH. Dilute bleach can damage body tissues (e.g. eyes or wounds).
- c. Precautions in emergency decon.
 - 1) Remove clothing (may have to cut off).
 - 2) Minimize contact with contaminated clothing.
 - 3) Segregate/isolate removed clothing.
 - 4) Ensure modesty of anyone decontaminated.
 - a) Provide barriers to shield victims from spectators.
 - b) Provide temporary garments or covering.
 - c) Segregate sexes.
 - d. Emergency decon and emergency medical treatment.
 - 1) Decon contaminated victims prior to transporting.
 - 2) Protect equipment and vehicles from contamination.
 - 3) Segregate any contaminated materials.

6. Decon Team Personnel, Roles and Responsibilities.

- a. Your employer's emergency response plan must include provisions for decon (both emergency and primary).
- b. Incident Command System roles.
 - 1) Haz Mat Group Supervisor (under Operations). Manages all tactical operations carried out in the Exclusion Zone.
 - a) Entry Team.
 - b) Site Access Control.
 - c) Decon Unit Leader (responsible for all decon operations).
 - 2) Decon Unit Leader (under Haz Mat Group Supervisor). Responsible for operations of Decontamination Unit.
 - a) Establish Decon Zone.
 - b) Identify contaminated people and equipment.
 - c) Supervise decon unit.
 - d) Control of movement within Decon & Post Decon Zone.
 - e) Coordinate transfer of contaminated patients.
 - f) FROs may be trained to fill Decon Unit roles.

7. Disposal Requirements.

- a. A Haz Mat incident almost always creates Hazardous Waste.
 - 1) “Hazardous Waste” is any Haz Mat that can’t be reused.
 - 2) Hazardous Waste possesses one or more “Characteristics” (is Toxic, is Reactive, is Ignitable with Flash Point of 141 degrees or less, is Corrosive with a pH of 2 or less/12.5 or more; etc.).

- b. Federal and State Governments have hazardous waste disposal requirements—You must know and follow them.
 - 1) Hazardous Waste must legally be tracked from “Cradle to Grave” (i.e. Generator, Transporter, Treatment, Storage & Disposal Facility).
 - a) Disposing of hazardous waste has strict requirements for documentation that apply to all generators (including government agencies).
 - b) “Flushing Haz Mats Away” harms the environment, is no longer acceptable, and is often a violation of the law!
 - 2) Original owner (e.g. DRMO for military waste) may recover abandoned hazardous waste if requested.

8. Chemical Exposure Records.

- a. Employer shall keep exposure records for responders/receivers (and retain them for 30 years after termination of employment).
- b. All responders/receivers should also keep their own exposure records.
- c. Exposure Records should include:
 - 1) Date, time, location and incident number,
 - 2) Responder/Receiver's name,
 - 3) Chemical name,
 - 4) Type and concentration/duration of exposure,
 - 5) Decon and medical aid given, etc.

Exposure Records

Chemical Exposure Records Should Include:

Dates, Time, Location & Incident/Event Number

Names of Material(s) & Responder/Receiver

Type, Concentration & Duration of Exposure

Decon, Medical Treatment, Related Circumstances, etc.

Employer must retain exposure records for at least 30 years after the employee retires, quits, gets fired, dies, disappears, etc.



Title 8 CCR 3204(d)(1)(A) Employee Medical Records
Title 8 CCR 3204(d)(1)(B) Employee Exposure Records
29 CFR 1910.1020(d)(1)(i) Employee Medical Records
29 CFR 1910.1020(d)(1)(i)(C)(ii) Employee Exposure Records

Decontamination Liability—Runoff

42 USC §9607(d) (CERCLA)

- General:* “... no person shall be liable under this subchapter for costs or damages as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the National Contingency Plan (“NCP”) or at the direction of an on-scene coordinator appointed under such plan, with respect to an incident creating a danger to public health or welfare or the environment as a result of any releases of a hazardous substance or the threat thereof. This paragraph shall not preclude liability for costs or damages as the result of negligence on the part of such person.”
- Government:* “No state or local government shall be liable under this subchapter for costs or damages as a result of actions taken in response to an emergency created by the release or threatened release of a hazardous substance generated by or from a facility owned by another person.”
- Fine Print:* “This paragraph shall not preclude liability for costs or damages as a result of gross negligence or intentional misconduct by the state or local government. ...reckless, willful, or wanton misconduct shall constitute gross negligence.”
- EPA Policy:* “EPA will not pursue enforcement actions against state and local responders/receivers for the environmental consequences of necessary and appropriate emergency response actions...Contaminated runoff should be avoided whenever possible, but should not impede necessary and appropriate actions to protect human life and health.” USEPA letter dated September 17, 1999, Office of Solid Waste and Emergency Response, Mr. J Jim Makris.

Decontamination Liability—Emergency Decon

Federal Way, WA 1996

Drug Lab: On April 15, 1996, police officers raided a clandestine methamphetamine lab in an apartment house. They arrested two suspects. Shortly thereafter, the local fire department directed seven of the officers to undergo emergency decontamination. Two of the officers were women. The women later filed a complaint against the fire district alleging the firefighters (all male) forced them to take off all of their clothes behind a makeshift shelter. They alleged the male firefighters “peered at them and made degrading remarks about their figures...” during the decontamination process. A mediator agreed with them and awarded each of the female police officers \$105,000.00. The fire district had to pay \$100,000.00 to each woman and the county had to pay \$5,000.00. (Source: Seattle Times, July 11, 1996, page B1)

Earlimart, CA 1999

Pesticides: On November 13, 1999, farm workers applied a soil fumigant (Sectagon 42) to a 75-acre potato field. A noticeable odor from the product later drifted into a residential area. Emergency responders arrived and found the substance contained metam sodium. They began emergency decontamination procedures for everyone who had been exposed. Although the responders provided temporary shelters, the residents felt this was inadequate and objected to having to remove their clothes in the presence of emergency response personnel, spectators and the media. They later voiced their objections to the County Board of Supervisors and a member of the California Assembly. (Source: Fresno Bee, December 9, 1999 and Associated Press, December 9, 1999)

Participant Worksheet

1. In your own words, define “Decontamination” and explain why it is necessary during Haz Mat incidents:

2. Per local jurisdictional policy, briefly describe your Decon procedures:

3. Per local jurisdictional policy, briefly identify how hazardous materials will be properly disposed of at Haz Mat incidents:

4. Identify the reasons for, and components of, good documentation during Haz Mat incidents:

POSSIBLE EXPOSURE TO A HAZARDOUS SUBSTANCE

For your own health and safety as well as others,
you must be thoroughly cleaned before we can safely treat you

This is what you must do

Please read all the steps
Follow the steps in order

DESIGNATED AREA.

1. Prepare to undress in the privacy area.

REMOVE YOUR CLOTHES

2. Open the plastic bags.
3. Place all of your valuables (wallet, keys) into the small plastic bag and seal it.
Keep prescription glasses or hearing aids, keep them with you.
4. Remove ALL your clothing.
5. Put clothes into large plastic bag.
6. Put the small valuables bag and large clothes bag in the designated place.

PUT ON IDENTIFICATION

7. Put on the wristband or neck identification.
8. Now step into the shower / tub area.

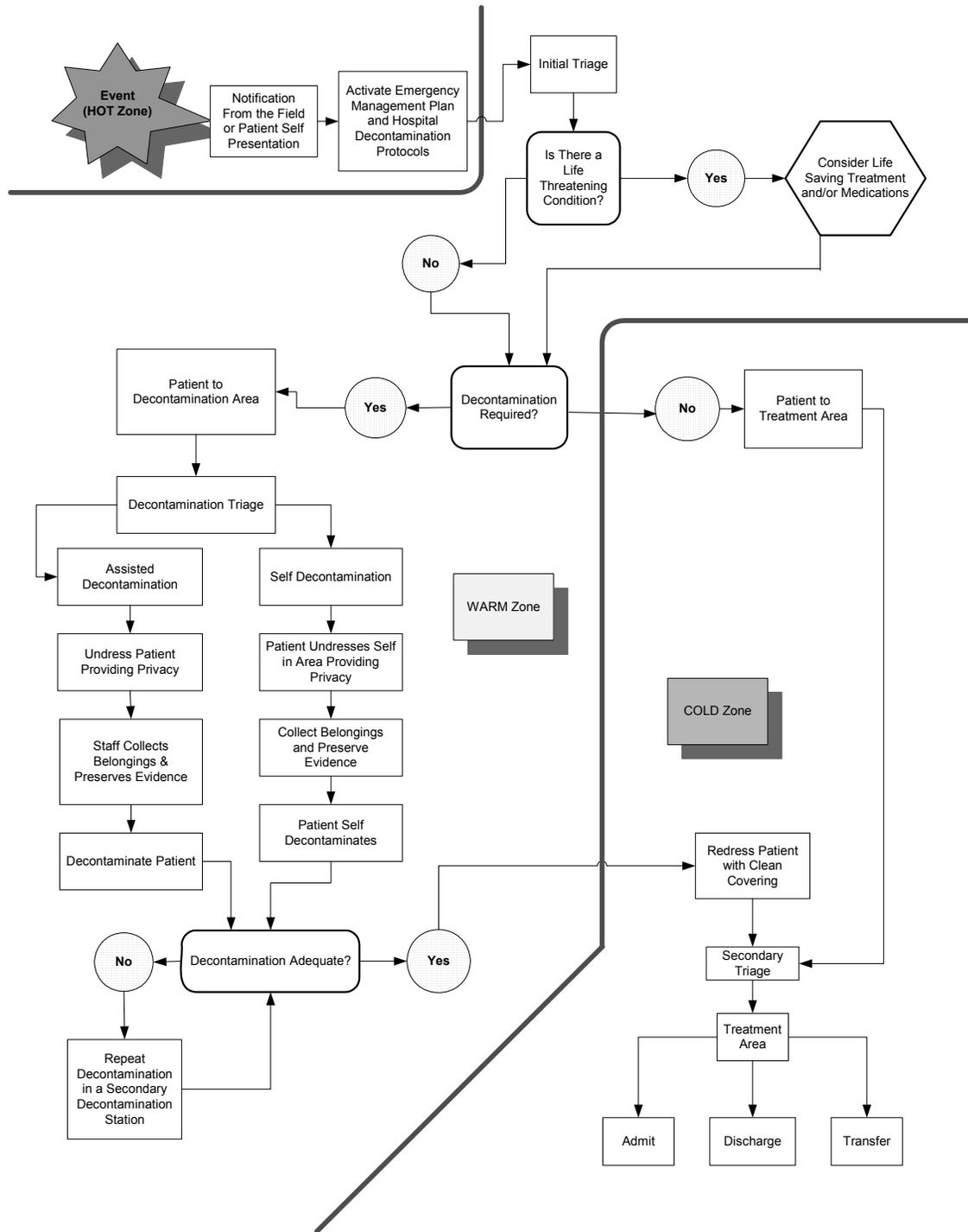
SHOWER AREA

9. Wet yourself all over in the shower.
10. Thoroughly wash with soap and water, paying attention to hair, ears, etc.
11. Rinse for at least one minute.

AFTER SHOWERING

13. You will be taken to the treatment area.
14. If it is safe, we will give you back your clothes and valuables.

Algorithm for Chemical Decontamination in a Hospital Setting



Contamination Reduction Corridor

<p>Patients entering from Hot (Exclusion) Zone</p> <p>DIRTY</p>	<p>Decon Resource Team</p> <p>Decon Initial Contact Unit Leader Decon Triage Unit Leader (Stay upwind & keep distance from pt) Stripper, Bagger</p> <p>Highly contaminated Patients</p>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: auto;"> <p>Safe Refuge Area</p> </div>
<p>Shower one / tub one</p> <p>Warm Zone</p> <p>CLEANER</p>	<p>Decon Resource Team</p> <p>Washer, Rinser</p> <p>Less contaminated Patients</p>	
<p>Shower two / tub two</p> <p>Warm Zone</p> <p>CLEANER</p>	<p>Decon Resource Team</p> <p>Washer, Rinser</p> <p>Less contaminated Patients</p>	
<p>CLEAN</p> <p>Patients exit to Cold (Support) Zone</p>	<p>Decon Resource Team</p> <p>Dryer, Dresser Gatekeeper, Admittance checklist</p> <p>Un-contaminated Patients</p>	

Safe Haven Area

Job Action Sheet

Operations Section
 Hazardous Materials Branch
ASSISTANT SAFETY OFFICER

ASSISTANT SAFETY OFFICER

Mission: Monitor and have authority over the safety of decontamination operations and hazardous conditions. Organize and enforce worker protection and overall Unit safety.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____	
Position Reports to: Hazardous Materials Branch Director Signature: _____	
Hospital Command Center (HCC) Location: _____ Telephone: _____	
Fax: _____ Other Contact Info: _____ Radio Title: _____	

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Hazardous Materials Branch Director.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Initiate and maintain Safety Plan.		
Initiate and maintain communications with Victim Decon Group Supervisor, Decon Facilities Unit; Forward Unit; Services Unit; and Rapid Intervention Unit leaders.		
Coordinate medical baseline on Victim Decon Group members.		
Do not permit individuals with medical baseline, history, or conditions outside of accepted limits to don PPE.		
Retain medical baseline information and continue to monitor Decon Group.		
Ensure that proper PPE is selected and donned correctly.		
Continue to monitor PPE protective ability to hazardous substances.		
Establish and maintain verbal contact with Victim Decon Group members. Review emergency communications such as hand signals.		
Monitor Victim Decon Group members for stress (including physical, chemical, environmental, and psychological stress). Report immediately any change in status to Victim Decon Group Supervisor.		
In conjunction with Decon Facilities Unit Leader, establish environmental monitoring of the Contamination Reduction Corridor (if appropriate and available).		
Inform Victim Decon Group Supervisor of correct safe work practices.		
Establish communications and coordinate operations with Technical Specialist hazardous materials resources as needed and if available.		
Establish communications with resources such as Poison Control, CHEMTREC, County		

Job Action Sheet

Operations Section
Hazardous Materials Branch
ASSISTANT SAFETY OFFICER

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Health, Hospital Lab, County Lab, Local Fire Department and Hazmat Team, National Response Team, State Agricultural Authorities, on-site responders, etc as appropriate.		
Review multiple sources of reference material. (connect boxes)		
If the contaminant is known, identify and report hazards, signs and symptoms, and characteristics of the hazardous material to team and Victim Decon Group Supervisor.		
Convey findings and other pertinent information to interested organizations as appropriate either directly or via the Liaison Officer.		
Continuously evaluate and recommend facility / staff protective action options to Victim Decon Group Supervisor.		
Advise the Victim Decon Group Supervisor of deviations from safe work practices or of any dangerous situations.		
Ensure the protection of the Victim Decon Group members from physical, environmental, biological, chemical hazards or exposures.		
In conjunction with the Victim Decon Group Supervisor, you have the authority to alter, suspend, or terminate any activity that may be judged to be unsafe.		
Based on information available determine whether the Decon Group is in a "go," "no-go," or "modify to go" circumstance based on contaminant, staffing, PPE, and response equipment. Convey determination to Victim Decon Group Supervisor and Branch Director.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with the Victim Decon Supervisor and Branch Director for status reports, and relay important information to Unit Members, if any.		
Ensure staff are rotated and replaced as needed.		
Monitor results of medical monitoring of staff; coordinate with the Employee Health & Well-Being Unit Leader.		
Monitor hazard monitoring continues and issues are addressed.		
Coordinate medical assessment of resource team members when Victim Decon Group Supervisor deactivates or fatigue rotation.		
Advise Hazardous Victim Decon Supervisor and Branch Director immediately of any operational issue you are not able to correct or resolve.		
File Safety Plan with HazMat Branch Director as appropriate.		

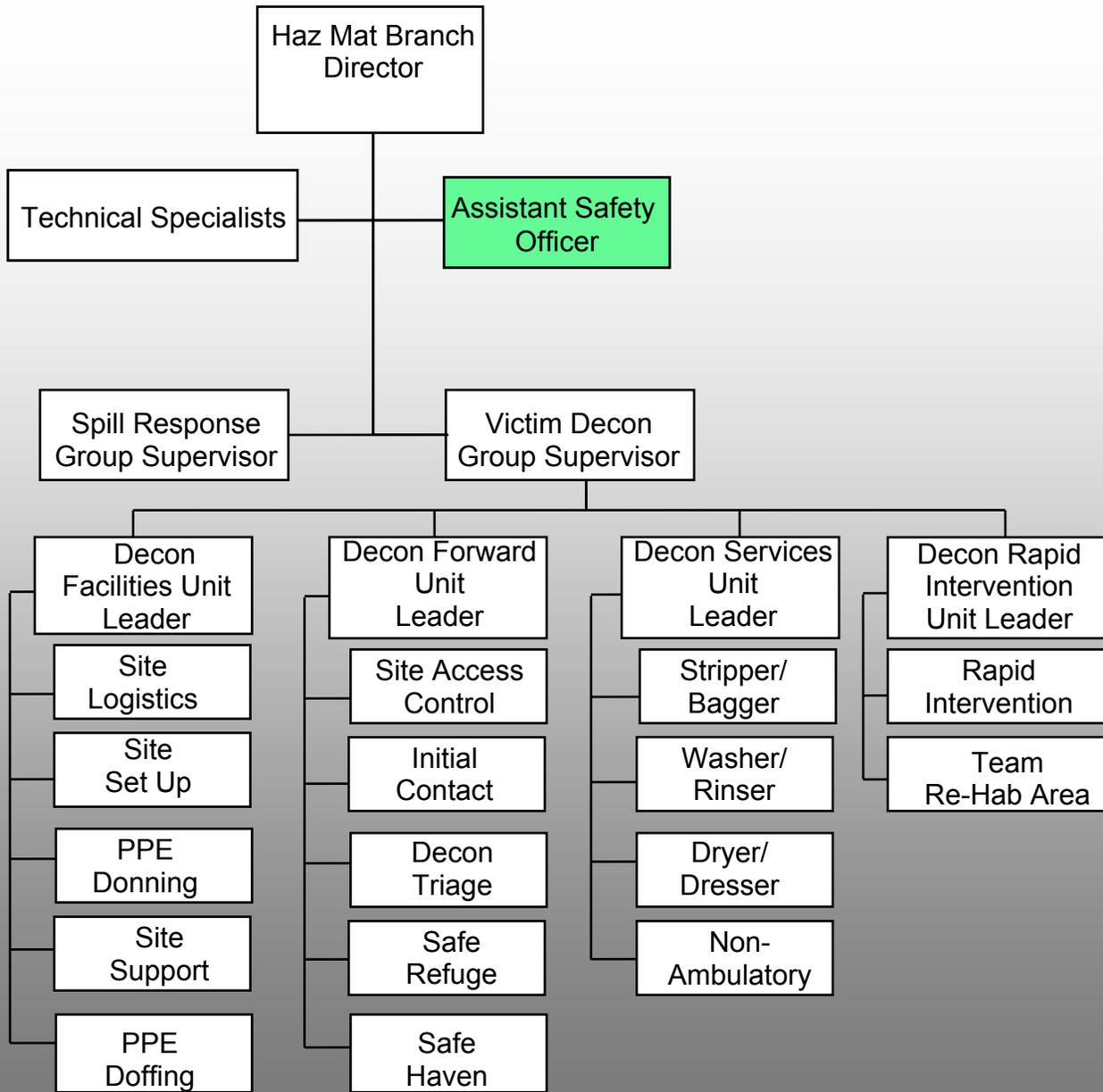
Demobilization/System Recovery	Time	Initial
Help ensure Victim Decontamination Group members are notified to terminate operations.		
Help ensure decontamination equipment is cleaned, repaired, and replaced as warranted.		

Job Action Sheet

Operations Section
 Hazardous Materials Branch
ASSISTANT SAFETY OFFICER

Demobilization/System Recovery	Time	Initial
Help ensure disposable materials and wastes are properly managed.		
Ensure monitoring of the decontamination area, commensurate with agent risks.		
Help ensure medical monitoring data on decontamination staff is being collected and submitted to Employee Health & Well-Being Unit for review and entry into personnel health files.		
Help ensure monitoring of medical surveillance of decontamination staff when initiated as needed and/or per recommendations of internal/external experts, in collaboration with Employee Health & Well-Being Unit.		
Debrief staff on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Hazardous Materials Branch Director or Operations Section Chief, as appropriate.		
Upon deactivation of your position, brief the Victim Decon Group Supervisor or Haz Mat Branch Director, as appropriate, on current problems, outstanding issues, and follow-up requirements.		
Submit comments to the Haz Mat Branch Director for discussion and possible inclusion in the after-action report; topics include: <ul style="list-style-type: none"> • Review of pertinent position descriptions and operational checklists • Recommendations for procedure changes • Section accomplishments and issues 		
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital patient decontamination plan (e.g., decontamination area drawings, procedures, and documentation logs) • Material Safety Data Sheets (MSDS) • Hospital organization chart • Hospital telephone directory • Radio/satellite phone



HAZARDOUS MATERIALS BRANCH DIRECTOR

Mission: Organize and direct hazardous material incident response activities: detection and monitoring; spill response; victim, technical, and emergency decontamination; and facility and equipment decontamination.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Operations Section Chief Signature: _____
 Hospital Command Center (HCC) Location: _____ Telephone: _____
 Fax: _____ Other Contact Info: _____ Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Receive appointment and briefing from the Operations Section Chief. Obtain packet containing Hazardous Materials Branch Job Action Sheets.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Determine need for and appropriately appoint Hazardous Materials Branch Group Supervisors and Unit Leaders; distribute corresponding Job Action Sheets and position identification. Complete the Branch Assignment List (HICS Form 204).		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Brief the Hazardous Materials Branch on current situation, incident objectives and strategy; outline Branch action plan and designate time for next briefing.		
Ensure Branch personnel comply with safety policies and procedures.		
Obtain hazardous materials agent information and notify Hazardous Materials Branch Unit Leaders, hospital emergency department, and other treatment areas.		
Evaluate special response needs to include: <ul style="list-style-type: none"> • coordination with local or area external hazardous materials teams • level and type of decontamination needed (e.g., dry, radiological, technical, gross) 		
Ensure hazard monitoring in open and enclosed spaces; coordinate with the HICS Safety Officer.		
Ensure hospital's internal spill response plan is activated, as appropriate.		
Appoint and brief the Victim Decon Group Supervisor.		
Ensure the set-up and staffing of decontamination areas, as appropriate to incident.		
Ensure mass decontamination system is functional and meets decontamination needs.		
Ensure appropriate antidote supplies are delivered to the decontamination area if indicated. Coordinate with the Supply Unit Leader and Clinical Support Services Unit.		
Review antidote administration procedure(s) with decontamination personnel, if needed.		

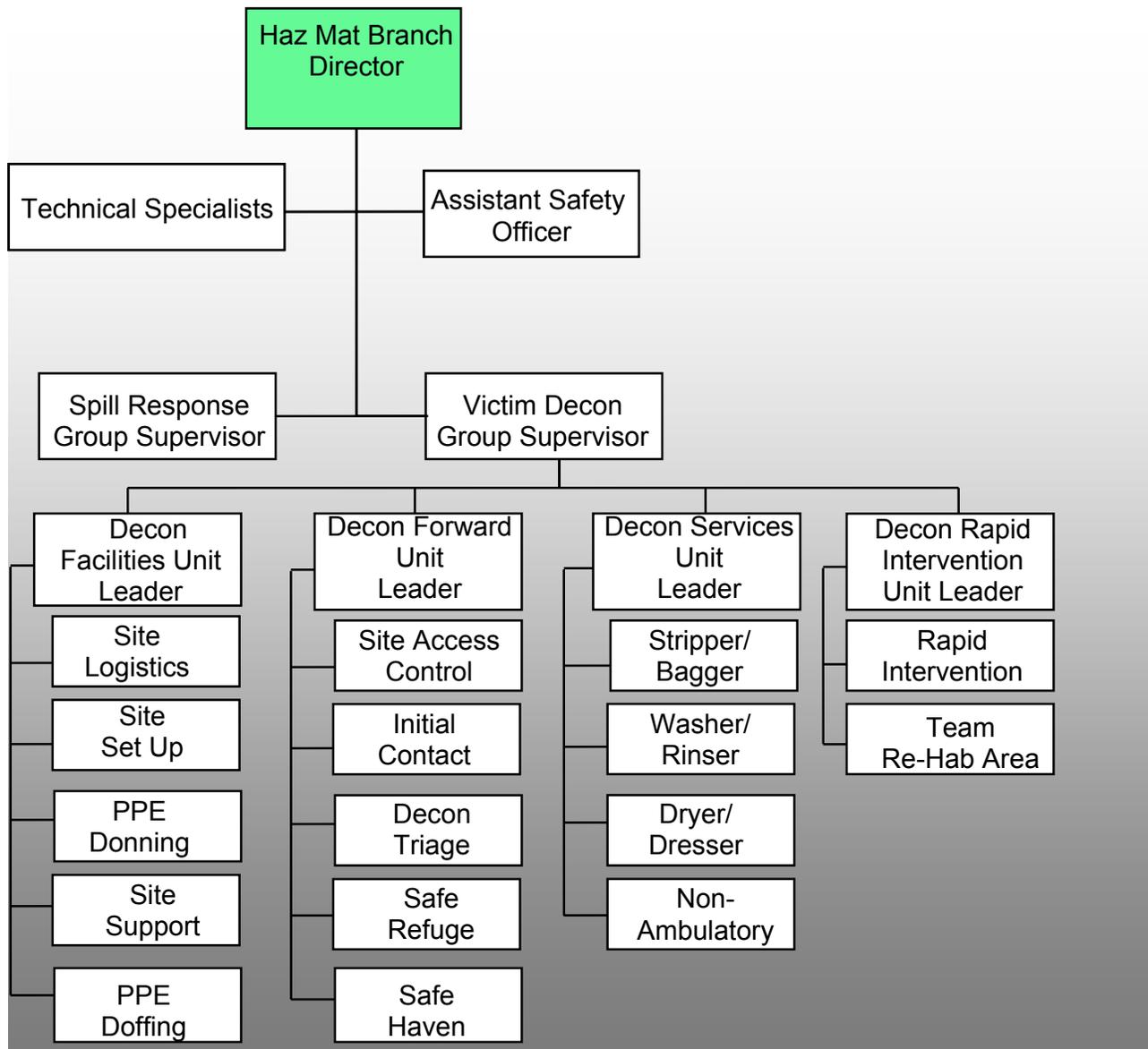
Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Establish medical monitoring of decontamination team members; coordinate with the Employee Health & Well-Being Unit Leader.		
Document all communications (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		
Ensure patient valuables are collected and secured and coordinate with the Security Branch Director.		
Determine special equipment and supply needs; request from the Supply Unit Leader and report of Operations Section Chief.		
Notify local water authority of situation, as appropriate, and determine if containment of any run-off is required.		
Ensure proper wastewater collection and disposal, in compliance with recommendations from water authority, emergency management, and/or local hazardous material team/fire department.		
Make requests for external assistance as needed, in coordination with the Liaison Officer.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with Operations Section Chief for status reports, and relay important information to Branch staff.		
Ensure staff are rotated and replaced as needed.		
Track results of medical monitoring of staff, in collaboration with the Employee Health and Well-Being Unit Leader.		
Activate supplemental staffing plan as indicated.		
Ensure hazard monitoring continues and issues are addressed; coordinate with the Safety Officer.		
Continue to maintain chain of custody of all patient valuables and contaminated clothing in coordination with the Security Branch Director.		
Ensure decontamination supplies and PPE are replaced as needed.		
Ensure contaminated materials are disposed of properly.		
Prepare for the possibility of evacuation and/or the relocation of the decontamination area as needed.		
Receive regularly updated reports from Hazardous Materials Branch Team Leaders.		
Consult with Medical/Technical Specialist as needed to provide updated clinical management information to appropriate areas as available.		
Communicate status with external authorities, as appropriate, in coordination with the Liaison Officer.		
Coordinate internal repair activities, consulting when needed with Infrastructure Branch Director.		
Develop and submit a Branch action plan to the Operations Section Chief when requested.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Advise Operations Section Chief immediately of any operational issue you are not able to correct or resolve.		

Demobilization/System Recovery	Time	Initial
As needs for Hazardous Material Branch staff decrease, return staff to their usual jobs and combine or deactivate positions in a phased manner.		
Manage and secure patient belongings and valuables according to hospital policy; consult with Safety officer, Security Branch Director and local fire and law enforcement, as appropriate.		
Ensure the Hazardous Materials Branch Units are notified to terminate operations.		
Ensure the decontamination equipment is cleaned, repaired, and replaced as needed.		
Ensure proper disposal of waste material; coordinate cost issues with the Finance/Administration Section.		
Ensure disposable materials and wastes are properly managed.		
Address the return of patient valuables with the Security Branch Director, local law enforcement, fire department, and hazardous materials teams.		
Ensure the decontamination areas are decontaminated, commensurate with agent and regulatory guidelines.		
Ensure medical monitoring data is collected and submitted to Employee Health & Well-Being Unit for review and entry into personnel health files.		
Ensure medical surveillance of staff is initiated as needed and/or per recommendations of internal/external experts, in collaboration with Employee Health & Well-Being Unit.		
Ensure return/retrieval of equipment and supplies and return all assigned incident command equipment.		
Notify Operations Section Chief when clean-up/restoration is complete.		
Debrief staff on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Operations Section Chief.		
Upon deactivation of your position, brief the Operations Section Chief on current problems, outstanding issues, and follow-up requirements.		
Submit comments to the Operations Section Chief for discussion and possible inclusion in the after-action report; topics include: <ul style="list-style-type: none"> • Review of pertinent position descriptions and operational checklists • Recommendations for procedure changes • Section accomplishments and issues 		
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 204 – Branch Assignment Sheet • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital organization chart • Hospital telephone directory • Radio/satellite phone • Decontamination area drawings, procedures, and documentation logs



DECON DRYER/DRESSER TASK LIST

Mission: Ensure contamination-free ambulatory victims are thoroughly dried and redressed and sent to Safe Haven area.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
 Position Reports to: Decon Services Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE and appropriate unique identifier. Level C is usually the initial ensemble but may be Standard Precautions or Level D
Review communication methods being used by Services Unit Leader.
Establish and maintain visual/verbal contact with: Washer/Rinser and Safe Haven positions
Assume position inside in patient drying/dressing area.
Ensure your area has sufficient materials for the number of patients expected. Towels, dressing gowns, seating
Call for a victim to be sent to you indicating gender if appropriate.
Verbally guide victim to dry entire body thoroughly - physically assist only if necessary
Observe patient for any signs of stress that may interfere with complete drying and dressing.
Observe patient for any signs or symptoms that might indicate contaminate is still on victim. Powders, itchy skin, burning eyes, complaint of discomfort, etc. Send back if any reasonable doubt exists – with approval of Washer/Rinser
Have victim redress themselves – physically assist only if necessary
Send victim to Safe Haven area. Ensure Safe Haven is ready to accept victim
Prepare your area for the reception and call for next victim.
In the event of PPE failure or personal distress, notify buddy and Decon Services Unit Leader. Seek assistance as directed.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Services Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decon of yourself and all other team members.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

Job Action Sheet

Operations Section
 Hazardous Materials Branch
 Victim Decon Group Supervisor
DECON FORWARD UNIT LEADER

DECON FORWARD UNIT LEADER

Mission: Establish and maintain control of Decon Forward Unit. Coordinate the immediate arrival activities of contaminated victims prior to entry into the decontamination reduction corridor.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____

Position Reports to: Victim Decon Group Supervisor Signature: _____

Hospital Command Center (HCC) Location: _____ Telephone: _____

Fax: _____ Other Contact Info: _____ Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not necessarily in order of execution.	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Victim Decon Group Supervisor.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Report for medical baseline.		
Don appropriate PPE. (Level D PPE usually required.)		
Appoint Forward Unit members. Site Access Control: _____ Initial Contract: _____ Decon Triage: _____ Refuge Area: _____ Safe Haven: _____		
Monitor and supervise the operations of the Unit members while staying in the Cold Zone area		
Obtain communications tools (e.g. radio, loud hailer, whiteboard).		
Review hand signals, IAP, and Safety Plan with Unit members.		
Ensure that Unit members have appropriate PPE labeled with names for easier identification.		
Initiate and maintain communications with: Victim Decon Group Supervisor: _____ Assistant Safety Officer: _____ Services Unit Leader: _____ Preparation Unit Leader: _____		

Job Action Sheet

Operations Section
 Hazardous Materials Branch
 Victim Decon Group Supervisor
DECON FORWRD UNIT LEADER

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not necessarily in order of execution.	Time	Initial
Rapid Intervention Unit Leader: _____		
Before victims are present, take a position that allows coordination and communications with the Unit members.		
Report patient census and status to Victim Decon Group Supervisor.		
Inform Victim Decon Group Supervisor of unsafe work practices.		
Continuously evaluate and recommend facility / staff protective action options to Victim Decon Group Supervisor.		
Ensure the protection of the Unit members from physical, environmental, biological, chemical hazards or exposures.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with the Victim Decon Group Supervisor for status reports, and relay important information to Unit Members.		
Ensure staff are rotated and replaced as needed.		
Monitor results of medical monitoring of staff; coordinate with the Employee Health & Well-Being Unit Leader.		
Ensure hazard monitoring continues in your area and issues are addressed.		
Advise Victim Decon Group Supervisor immediately of any operational issue you are not able to resolve.		

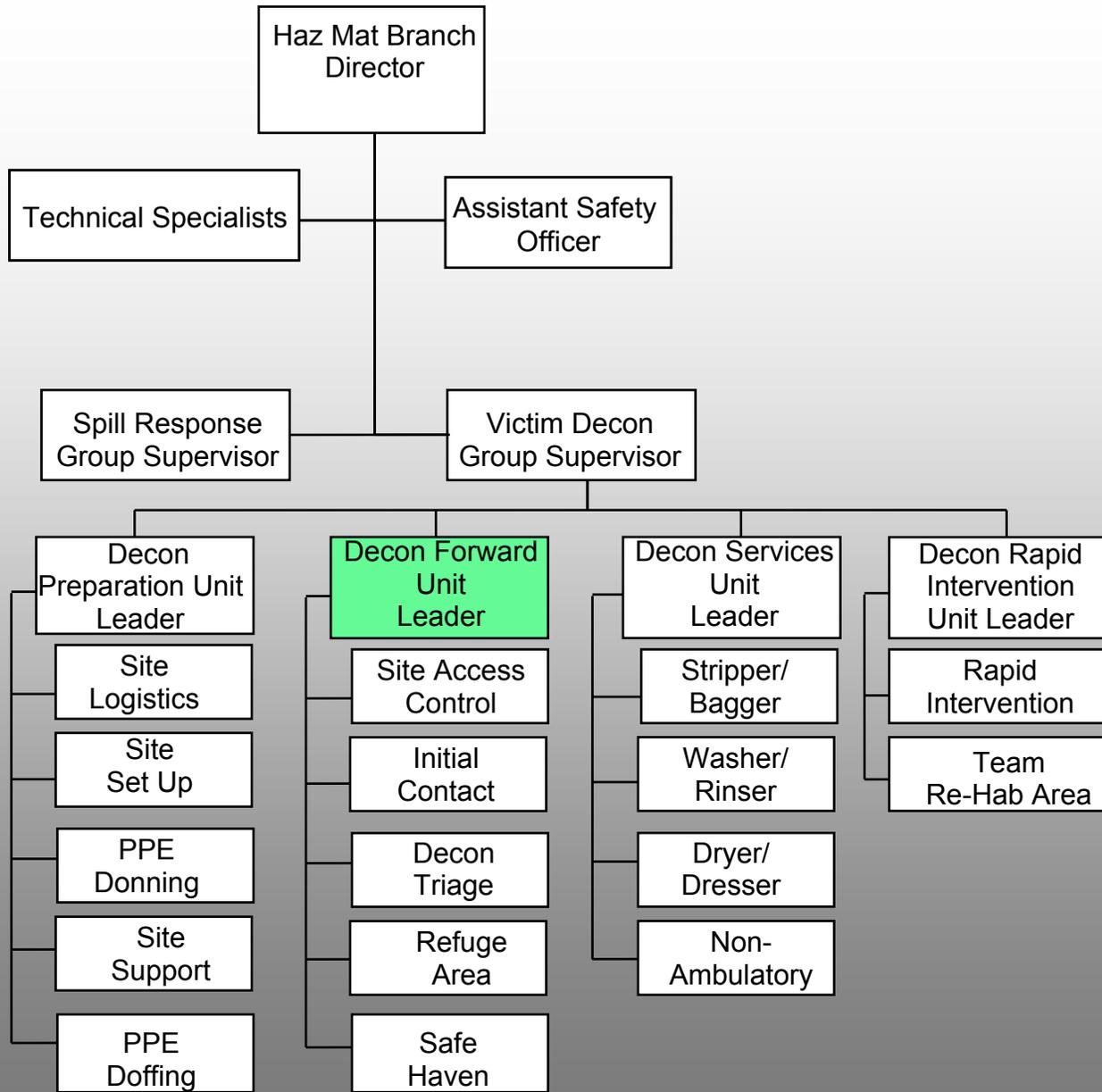
Demobilization/System Recovery	Time	Initial
At deactivation, or fatigue rotation, ensure Unit members report through Contamination Reduction Corridor and are effectively decontaminated.		
As needs for the Unit's staff decrease, return staff to their usual jobs and combine or deactivate positions in a phased manner.		
Ensure Unit members are notified to terminate operations.		
Ensure Unit members assist with decontamination of equipment, repairing, and replacing as warranted.		
Monitor medical surveillance of Unit members when initiated as needed and/or per recommendations of internal/external experts, in collaboration with Employee Health & Well-Being Unit.		
Debrief staff on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Victim Decon Group Supervisor as appropriate.		
<ul style="list-style-type: none"> • Submit comments to the Victim Decon Group Supervisor for discussion and possible inclusion in the after-action report; topics include: • Review of pertinent position descriptions and operational checklists • Recommendations for procedure changes • Section accomplishments and issues 		

Job Action Sheet

Operations Section
 Hazardous Materials Branch
 Victim Decon Group Supervisor
DECON FORWRD UNIT LEADER

Demobilization/System Recovery	Time	Initial
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 204 – Branch Assignment List • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital patient decontamination plan (e.g., decontamination area drawings, procedures, and documentation logs) • Material Safety Data Sheets (MSDS) • Hospital organization chart • Hospital telephone directory • Radio/satellite phone



DECON INITIAL CONTACT TASK LIST

Mission: Greet individuals directed by Site Access Control and provide information and direction regarding the decontamination process. Direct them to Decon Triage for further processing.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____ Position Reports to: Decon Forward Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE. Level C is usually the initial ensemble
Don appropriate unique identifier.
Review communication methods being used by Forward Unit Leader.
Establish and maintain visual/verbal contact with: Decon Triage and Site Access Control positions
Assume position as point “greeter”. Just on the “Hot” side of the Contamination Reduction Corridor Greet each person approaching your position Do not touch any person or allow them to touch you Explain the reason that they have been directed to your position
Determine if the person is a victim of contamination. Ask if they have been contaminated with a hazardous substance and observe for signs and symptoms of exposure/contamination
Direct all contamination victims encountered to the Decon Triage position.
Direct uncontaminated patients to ED medical triage or other designated area.
May assist Stripper/Bagger if directed by Forward Unit leader.
In the event of PPE failure or personal distress, notify buddy and Decon Forward Unit Leader. PROCEED THROUGH DECON and seek assistance.
Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Forward Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decontamination.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

DECON NON-AMBULATORY TASK LIST

Mission: Ensure contaminated non-ambulatory victims are thoroughly physically cleaned of all contamination.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Services Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE and appropriate unique identifier. Level C is usually the initial ensemble
Review communication methods being used by Services Unit Leader.
Establish and maintain visual/verbal contact with: Stripper/Bagger, Washer/Rinser and Dryer/Dresser positions
Assume position in patient washing area especially prepared for non-ambulatory victims.
Ensure your area is prepared to accept victims that cannot walk on their own. Roller system for back boards, Gerry chairs, wheel chairs
Ensure your area has sufficient washing materials for the number of patients expected. Soap, sponges, soft brushes
Ensure your area is prepared with adequate tepid running water.
Ensure minimum three team members are available and ready to accept victims.
Call for a victim to be brought to you indicating gender if appropriate.
Disrobe victim and then physically wash entire body thoroughly.
Observe patient for any signs of stress that may interfere with complete decon.
Send victim to Dryer/Dresser area. Ensure Dryer/Dresser is ready to accept victim
Prepare your area and call for next victim.
In the event of PPE failure or personal distress, notify buddy and Decon Services Unit Leader. PROCEED THROUGH DECON and seek assistance.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Services Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decon.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

Job Action Sheet

Operations Section
 Hazardous Materials Branch
 Victim Decon Group Supervisor
DECON SERVICES UNIT LEADER

DECON SERVICES UNIT LEADER

Mission: Establish and maintain control of Decon Services Unit. Coordinate activities from the time contaminated victims enter into the decontamination wash area until handed off to Medical Triage personnel.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____	
Position Reports to: Victim Decon Group Supervisor Signature: _____	
Hospital Command Center (HCC) Location: _____	Telephone: _____
Fax: _____ Other Contact Info: _____	Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not necessarily in order of execution.	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Victim Decon Group Supervisor.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Report for medical baseline.		
Don appropriate PPE. (Level C PPE usually required.)		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Appoint Services Unit members. Stripper/Bagger: _____ Washer/Rinser: _____ Dryer/Dresser: _____ Non-Ambulatory: _____		
Brief Unit members on current situation, incident objectives and strategy; outline Unit action plan; and designate time for next briefing.		
Review hand signals with Unit members.		
Ensure that Unit members have appropriate PPE labeled with names for easier identification. (Level C PPE usually required.)		
Initiate and maintain communications with: Victim Decon Group Supervisor: _____ Assistant Safety Officer: _____ Forward Unit Leader: _____ Preparation Unit Leader: _____		

Job Action Sheet

Operations Section
 Hazardous Materials Branch
 Victim Decon Group Supervisor
DECON SERVICES UNIT LEADER

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not necessarily in order of execution.	Time	Initial
Rapid Intervention Unit Leader: _____		
Before victims are present, take a position that allows coordination and communication with the Group members.		
Ensure Non-Ambulatory Manager has needed equipment and personnel available.		
Ensure coordination with R.I.T. Unit Leader as to pre-designated rescue location.		
Report patient census and status to Victim Decon Group Supervisor.		
Inform Victim Decon Group Supervisor of unsafe work practices.		
Continuously evaluate and recommend facility / staff protective action options to Victim Decon Group Supervisor.		
Ensure the protection of the Unit members from physical, environmental, biological, chemical hazards or exposures.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with the Victim Decon Group Supervisor for status reports, and relay important information to Unit members.		
Ensure staff are rotated and replaced as needed.		
Monitor results of medical monitoring of staff; coordinate with the Employee Health & Well-Being Unit Leader.		
Ensure hazard monitoring continues in your area and issues are addressed.		
Advise Victim Decon Group Supervisor immediately of any operational issue you are not able to resolve.		

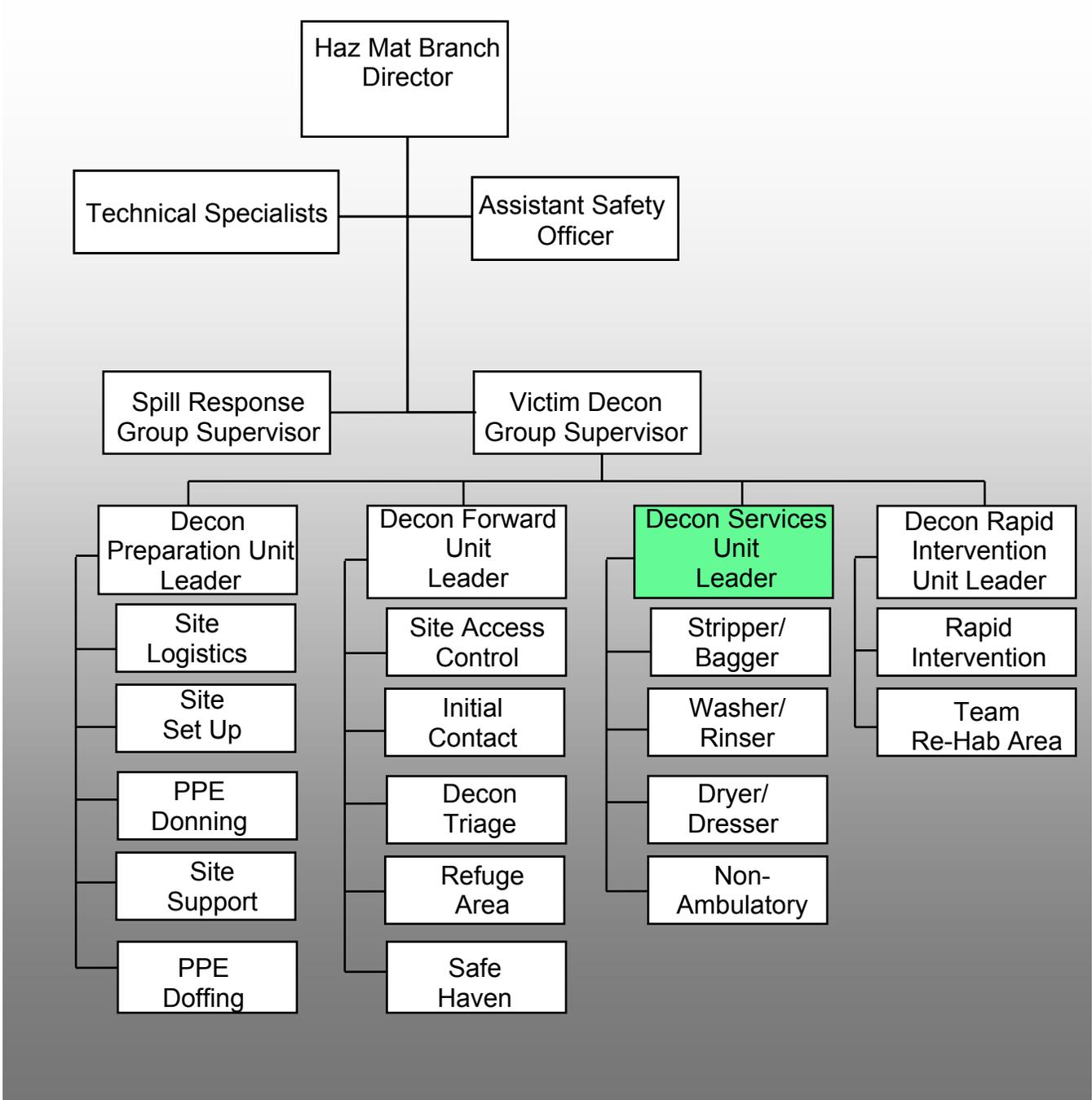
Demobilization/System Recovery	Time	Initial
At deactivation, or fatigue rotation, ensure Unit members report through Contamination Reduction Corridor and are effectively decontaminated.		
Ensure Unit members are notified to terminate operations.		
Ensure Facilities Unit Leader is notified that Unit members need PPE doffing services.		
Ensure Unit members report directly to PPE doffing area once they are decontaminated.		
As needs for the Unit's staff decrease, return staff to their usual jobs and combine or deactivate positions in a phased manner.		
Ensure Unit members assist with decontamination of equipment, repairing, and replacing as warranted.		
Monitor medical surveillance of Unit members when initiated as needed and/or per recommendations of internal/external experts, in collaboration with Employee Health & Well-Being Unit.		
Debrief staff on lessons learned and procedural/equipment changes needed.		

Job Action Sheet

Operations Section
 Hazardous Materials Branch
 Victim Decon Group Supervisor
DECON SERVICES UNIT LEADER

Demobilization/System Recovery	Time	Initial
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Victim Decon Group Supervisor as appropriate.		
Submit comments to the Victim Decon Group Supervisor for discussion and possible inclusion in the after-action report; topics include: Review of pertinent position descriptions and operational checklists Recommendations for procedure changes Groups accomplishments and issues		
Participate in stress management and after-action debriefings.		
Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 204 – Branch Assignment List • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital patient decontamination plan (e.g., decontamination area drawings, procedures, and documentation logs) • Material Safety Data Sheets (MSDS) • Hospital organization chart • Hospital telephone directory • Radio/satellite phone



DECON STRIPPER/BAGGER TASK LIST

Mission: Disrobe victims in preparation for decontamination while securing and tracking their physical possessions.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Services Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE and appropriate unique identifier. Level C is usually the initial ensemble
Review communication methods being used by Services Unit Leader.
Establish and maintain visual/verbal contact with: Initial Contact and Washer/Rinser positions
Assume position inside Contamination Reduction Corridor in patient clothing doffing area.
Ensure your area has sufficient doffing materials for the number of patients expected.
Ensure your area is prepared with seating for patients when they disrobe.
Call for a patient to be sent to you indicating gender if appropriate.
Verbally guide patient to remove all personal items from clothing and body, including jewelry, and place in smaller labeled bag - physically assist only if necessary
Guide patient in removing all clothing and place in larger labeled doffing bag - physically assist only if necessary
Send patient into washing area when called for by Washer/Rinser.
Secure all of the patient's personal effects bags in predetermined location.
Prepare your area for the reception of the next patient.
Call for the next patient.
May assist Washer/Rinser if census allows.
In the event of PPE failure or personal distress, notify buddy and Decon Services Unit Leader. PROCEED THROUGH DECON and seek assistance.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Services Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decon.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

DECON TRIAGE TASK LIST

Mission: Sort contaminated patients according to priority considering gender, prior conditions, signs and symptoms, ability to ambulate and level of contamination.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Forward Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE. Level C is usually the initial ensemble
Don appropriate unique identifier.
Review communication methods being used by Forward Unit Leader.
Establish and maintain visual/verbal contact: Initial Contact and Stripper/Bagger positions
Assume position just outside of the Contamination Reduction Corridor. Position between Initial Contact and Stripper/Bagger positions
Greet each person approaching your position.
Visually and verbally triage patients to establish decon priority. __Immediate __Delayed
Ensure Immediate victims go through the decon process as soon as possible.
Segregate victims: __Ambulatory/non-ambulatory __Male/female __Self-decon/assisted-decon
Verbally and/or physically guide contaminated patients to Stripper/Bagger position as called for by that position.
Send Delayed victims to Safe Refuge as needed to await decontamination.
In the event of PPE failure or personal distress, notify buddy and Decon Forward Unit Leader. PROCEED THROUGH DECON and seek assistance.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Forward Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decon.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

DECON WASHER/RINSER TASK LIST

Mission: Ensure contaminated ambulatory victims are thoroughly physically cleaned of all contamination.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Services Unit Leader _____

Task List

Receive appointment, briefing, and any appropriate materials.

Read this entire Task List Sheet.

Don appropriate PPE and appropriate unique identifier.
Level C is usually the initial ensemble

Review communication methods being used by Services Unit Leader.

Establish and maintain visual/verbal contact with:
Stripper/Bagger and Dryer/Dresser positions

Assume position inside in patient washing area.

Ensure your area has sufficient washing materials for the number of patients expected.
Soap, sponges, soft brushes

Ensure your area is prepared with adequate tepid running water.

Call for a victim to be sent to you indicating gender if appropriate.

Ensure victim is completely disrobed and all personal items are removed.

Verbally guide victim to wash entire body thoroughly - physically assist only if necessary

Observe patient for any signs of stress that may interfere with complete decon.

Observe patient for any signs or symptoms that might indicate contaminate is still on victim.
Powders, itchy skin, burning eyes, complaint of discomfort, etc.

Send victim to Dryer/Dresser area.
Ensure Dryer/Dresser is ready to accept victim

Prepare your area for the reception of the next patient and call for next victim.

In the event of PPE failure or personal distress, notify buddy and Decon Services Unit Leader. PROCEED THROUGH DECON and seek assistance.

Demobilization/System Recovery

Do not leave your post until advised to do so by the Decon Services Unit leader

Report through Contamination Reduction Corridor and ensure effective personal decon.

After thorough decon proceed to Team Doffing area.

Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

Job Action Sheet

OPERATIONS SECTION
 Hazardous Materials Branch
 Victim Decon Group Supervisor
PREPARATION UNIT LEADER

PREPARATION UNIT LEADER

Mission: Ensure the decontamination site is set up and fully prepared to accept and clean contaminated victims, provide support for team PPE requirements and on-going decontamination operations.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____

Position Reports to: Victim Decon Group Supervisor Signature: _____

Hospital Command Center (HCC) Location: _____ Telephone: _____

Fax: _____ Other Contact Info: _____ Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not necessarily in order of execution.	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Victim Decon Group Supervisor.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Report for medical baseline.		
Don appropriate PPE. (Level D PPE usually the initial ensemble.)		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Appoint Facilities Unit members. Logistics: _____ Site Setup : _____ PPE Don/Doff: _____ Site Support: _____		
Brief Unit members on current situation, incident objectives and strategy; outline Group action plan; and designate time for next briefing.		
Review hand signals with Unit members.		
Initiate and maintain communications with: Victim Decon Group Supervisor: _____ Assistant Safety Officer: _____ Forward Unit Leader: _____ Services Unit Leader: _____ Rapid Intervention Unit Leader: _____		

Job Action Sheet

OPERATIONS SECTION
 Hazardous Materials Branch
 Victim Decon Group Supervisor
PREPARATION UNIT LEADER

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not necessarily in order of execution.	Time	Initial
Before victims are present, take a position that allows coordination and communication with the Unit members.		
Inform Victim Decon Group Supervisor of unsafe work practices.		
Continuously evaluate and recommend facility / staff protective action options to Victim Decon Group Supervisor.		
Ensure security for team member's bagged valuables in or near PPE Donning Area.		
Ensure the protection of the Unit members from physical, environmental, biological, chemical hazards or exposures.		
Ensure adequate support for all team members throughout activity.		
Document all communications (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with the Victim Decon Group Supervisor for status reports, and relay important information to Unit Members.		
Ensure staff are rotated and replaced as needed.		
Monitor results of medical monitoring of staff; coordinate with the Employee Health & Well-Being Unit Leader.		
Ensure the PPE Doffing area is clearly identified so as to be readily seen by Services Unit members wearing full PPE.		
Ensure communication with Services Unit Leader to identify when members will need PPE doffing.		
Ensure hazard monitoring continues in your area and issues are addressed.		

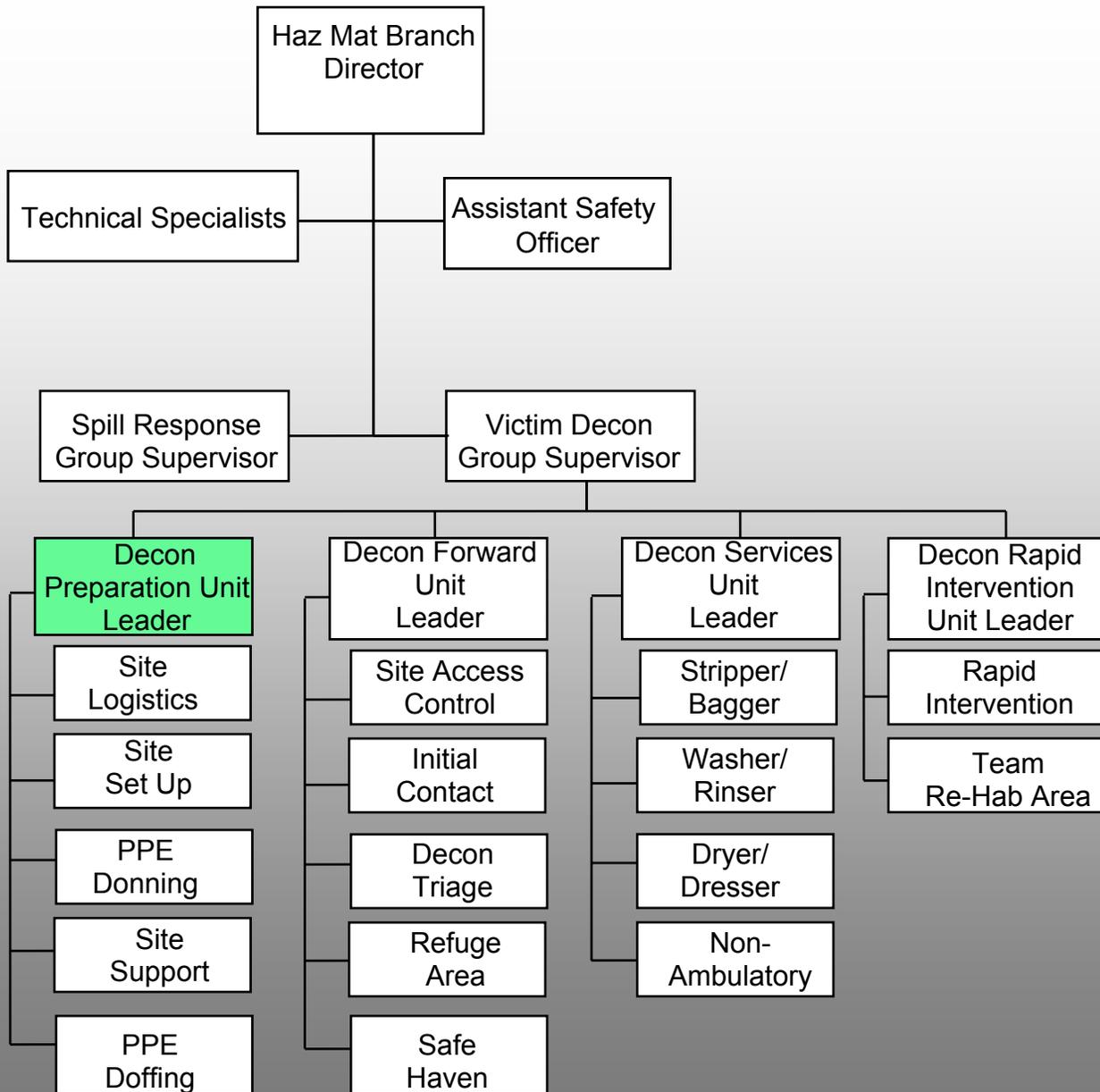
Demobilization/System Recovery	Time	Initial
At deactivation, or fatigue rotation, ensure Unit members report through Contamination Reduction Corridor and are effectively decontaminated.		
As needs for the Unit's staff decrease, return staff to their usual jobs and combine or deactivate positions in a phased manner.		
Ensure Unit members are notified to terminate operations.		
Ensure Unit members assist with decontamination of equipment, repairing, and replacing as warranted.		
Monitor medical surveillance of Unit members when initiated as needed and/or per recommendations of internal/external experts, in collaboration with Employee Health & Well-Being Unit.		
Debrief Unit on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Victim Decon Group Supervisor as appropriate.		

Job Action Sheet

OPERATIONS SECTION
 Hazardous Materials Branch
 Victim Decon Group Supervisor
PREPARATION UNIT LEADER

Demobilization/System Recovery	Time	Initial
Submit comments to the Victim Decon Group Supervisor for discussion and possible inclusion in the after-action report; topics include: Review of pertinent position descriptions and operational checklists Recommendations for procedure changes Group s accomplishments and issues		
Participate in stress management and after-action debriefings.		
Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 204 – Branch Assignment List • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital patient decontamination plan (e.g., decontamination area drawings, procedures, and documentation logs) • Material Safety Data Sheets (MSDS) • Hospital organization chart • Hospital telephone directory • Radio/satellite phone



RAPID INTERVENTION TEAM LEADER

Mission: To provide trained personnel to be readily available to initiate and effect a rescue of a downed, trapped, or disoriented person in the event of any emergency in the Warm or Hot (Pre-Decon) Zone.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Group Supervisor Signature: _____
Hospital Command Center (HCC) Location: _____ Telephone: _____
Fax: _____ Other Contact Info: _____ Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Decon Group Supervisor.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Appoint Rapid Intervention Team (R.I.T.) members. Unit Member: _____ Unit Member: _____ Unit Member: _____		
Brief R.I.T. on current situation, incident objectives and strategy; outline Team action plan; and designate time for next briefing.		
Ensure R.I.T. complies with safety policies and procedures including appropriate use of personal protective equipment.		
Don appropriate PPE Level C is usually the initial ensemble with PAPR hood available for immediate donning		
Ensure R.I.T. is equipped with tools to enable rescue of an incapacitated person in the Warm Zone.		
Brief R.I.T. on hand signals and other communication methods.		
Conduct a walk around of the Decon Corridor to familiarize yourself and your team with every aspect of the setup.		

Job Action Sheet

OPERATIONS SECTION
 Hazardous Materials Branch
 Decon Group Supervisor

RAPID INTERVENTION TEAM LEADER

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Position R.I.T. in the team member rehabilitation area in the Cold Zone with ready access to all areas of the decon corridor. Ensure R.I.T. members operate the rehabilitation area if no other staff is assigned there.		
Ensure R.I.T. members have tools and equipment to affect a rescue.		
Chose a designated end location for movement of an incapacitated person.		
Ensure ready communication of all aspects of R.I.T. preparation with Decon Group Supervisor and Assistant Safety Officer.		
Ensure coordination with Services Unit Leader as to pre-designated rescue location.		
If notified of a person in distress – immediately have R.I.T. don PAPR's and enter the Warm Zone as a team.		
Effect rescue and removal of incapacitated person to pre-designated rescue location.		
Monitor operation and call for assistance or additional equipment immediately as necessary.		
Immediately after rescue and handoff of an incapacitated person return to staging area and standby for other assignments.		
Document all communications (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with the Decon Group Supervisor for status reports, and relay important information to R.I.T. members.		
Secure R.I.T. Staging Area to limit unauthorized personnel access.		
Monitor use of personal protective equipment and any potential adverse impacts.		
Develop and submit an action plan to the Decon Group Supervisor when requested.		
Advise Decon Group Supervisor immediately of any operational issue you are not able to correct or resolve.		

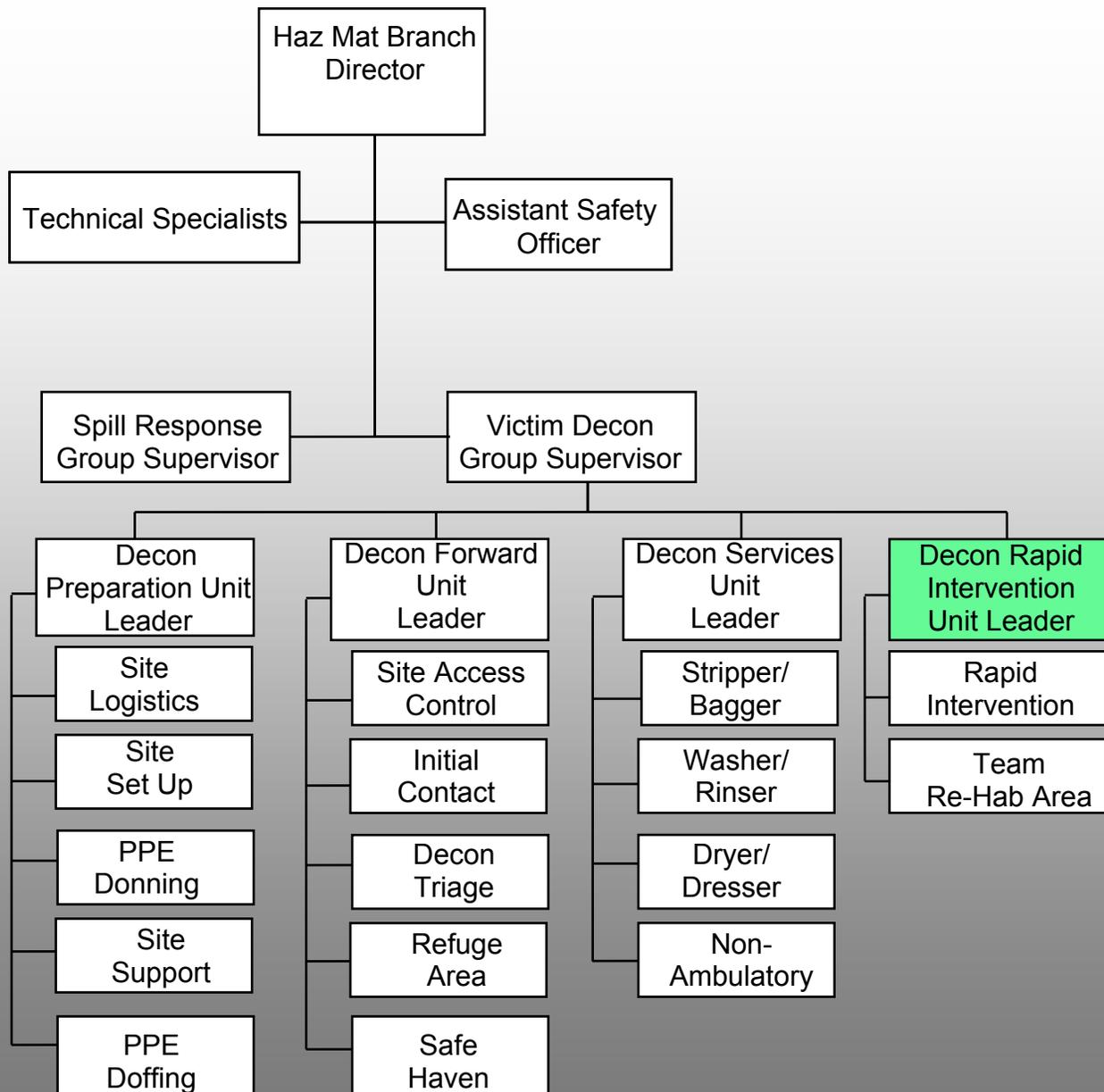
Demobilization/System Recovery	Time	Initial
As needs for the R.I.T.'s staff decrease, return staff to their usual jobs,		

Job Action Sheet

OPERATIONS SECTION
 Hazardous Materials Branch
 Decon Group Supervisor
RAPID INTERVENTION TEAM LEADER

Demobilization/System Recovery	Time	Initial
and combine or deactivate positions in a phased manner.		
Ensure return/retrieval of equipment and supplies and return all assigned incident command equipment.		
Debrief staff on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Decon Group Supervisor as appropriate.		
Upon deactivation of your position, brief the Decon Group Supervisor, as appropriate, on current problems, outstanding issues, and follow-up requirements.		
Submit comments to the Decon Group Supervisor for discussion and possible inclusion in the after-action report; topics include: <ul style="list-style-type: none"> • Review of pertinent position descriptions and operational checklists • Recommendations for procedure changes • Section accomplishments and issues 		
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 204 – Branch Assignment List • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital organization chart • Hospital telephone directory • Radio/satellite phone • Stokes litter or other person carrying device • Drag straps for person dragging • Hand lights



RAPID INTERVENTION TEAM TASK LIST

Mission: To be readily available to initiate and affect a rescue of a downed, trapped, or disoriented person in the Warm Zone.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Rapid Intervention Unit Leader: _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Ensure knowledge of control perimeters.
Don appropriate PPE. Level C is usually the initial ensemble with PAPR hood immediately available for donning
Review communication methods being used by R.I.T. Unit Leader
Check tools and equipment that will be used to enable a rescue.
Conduct a walk around of the Decon Corridor to familiarize yourself with every aspect of the setup. Ensure knowledge of the pre-designated area for transport of rescued victims
Position and remain in the Team Member Rehabilitation Area. Operate the rehabilitation area if no other staff is assigned there
If notified of a person in distress – Receive briefing, Don PAPR and Enter the Warm Zone as a team.
Effect rescue and removal of incapacitated person to the pre-designated location.
Immediately after rescue and handoff of an incapacitated person proceed through decon process to thoroughly clean PPE.
Return to re-hab area and standby for other assignments. Remove and turn off PAPR hood and motor. Keep PAPR motor belt around waist and hood immediately available for donning.

Demobilization/System Recovery
Do not leave your post until advised to do so by the R.I.T. Unit Leader.
If you entered the Warm Zone – Report through Contamination Reduction Corridor and ensure effective personal decon.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

REFUGE AREA TASK LIST

Mission: Contain contaminated victims in the Refuge Area, maintain surveillance of victims for medical situations, and release victims to Stripper/Bagger.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
 Position Reports to: Decon Forward Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Don appropriate PPE. Level C is usually the initial ensemble
Don appropriate unique identifier.
Review communication methods being used by Forward Unit Leader.
Establish and maintain visual/verbal contact with: Decon Triage and Stripper/Bagger positions
Assume position just outside of the Refuge Area.
Greet each person approaching your position. Explain why they are at your location and what will happen next
Visually and verbally monitor victims for changing status to assure decon priority. Adjust decon priority when victims' condition warrants
Verbally and/or physically guide contaminated victims to Stripper/Bagger position when called for by that position.
May assist Stripper/Bagger if directed by Decon Forward Unit Leader.
In the event of PPE failure or personal distress, notify buddy and Decon Forward Unit Leader. PROCEED THROUGH DECON and seek assistance.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Forward Unit leader
Report through Contamination Reduction Corridor and ensure effective personal decontamination.
After thorough decon proceed to Team Doffing area.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

REHABILITATION AREA TASK LIST

Mission: To be readily available to conduct team member rehabilitation in a manner that helps ensures their safety and health.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Rapid Intervention Unit Leader: _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Ensure knowledge of control perimeters.
Don appropriate PPE. Standard Precautions is usually the initial ensemble
Review communication methods being used by R.I.T. Unit Leader
Ensure rehabilitation area is ready to accept team members. Check supplies and equipment
Remain in the Team Member Rehabilitation Area.
Assist team members that report for rehabilitation from team suit doffing area. Have team member sit Offer water to drink Take medical vitals Offer food if appropriate Offer cot for member to lay on if needed
Notify Medical Triage if team member does not respond appropriately.
Allow team member to proceed to team suit donning area if: Heart rate is not in excess of 180 bpm minus individual's age Body core is less than 38.5°C (101.3°F) (38 °C for non-acclimatized workers) Heart rate after one minute peak work effort haz recovered to less than 110 bpm There are no symptoms of sudden and severe fatigue, nausea, dizziness, or lightheadedness

Demobilization/System Recovery
Do not leave your post until advised to do so by the R.I.T. Unit Leader.
Assist with the retrieval and return of all rehabilitation area equipment and supplies.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SAFE HAVEN AREA TASK LIST

Mission: Contain contamination-free victims in the Safe Haven Area, maintain surveillance of victims for medical situations, and release them to Medical Triage.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Forward Unit Leader _____

Task List

Receive appointment, briefing, and any appropriate materials.

Read this entire Task List Sheet.

Don appropriate PPE.
Level C is usually the initial ensemble

Don appropriate unique identifier.

Review communication methods being used by Forward Unit Leader.

Establish and maintain visual/verbal contact with:
Dryer/Dresser and Medical Triage positions

Assume position that ensures contact with victims from the Dryer/Dresser position and in the Safe Haven Area.

Verbally and/or physically guide contamination-free victims from Dryer/Dresser position within Contamination Reduction Corridor.

Visually and verbally monitor victims to assure medical triage priority.
Adjust triage priority when victims' condition warrants

May assist Dryer/Dresser if directed by Decon Forward Unit Leader.

Verbally and/or physically guide contamination-free victims to hand off with medical care personnel (e.g., Emergency Department)

Demobilization/System Recovery

Do not leave your post until advised to do so by the Decon Forward Unit leader

Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SITE ACCESS CONTROL TASK LIST

Mission: Ensure the safety of the facility's grounds and personnel by engaging individuals entering therein and directing them to the Initial Contact Position or appropriate location.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____ Position Reports to: Decon Forward Unit Leader _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Review communication methods being used by Forward Unit Leader. Hand signals, loud hailer, radio
Ensure knowledge of the medical facility site control perimeters.
Monitor the medical facility's site access control resource needs. Flags, barrier tape, cones, and signs
Assist with preparations for the physical security of the medical facility.
Don appropriate PPE as directed. Level D is usually the initial ensemble but may be altered by Forward Unit Leader Donning of unique identifier is critical for ready recognition by approaching citizens
Take a position as directed to secure the facility from unauthorized access.
Greet all people who enter the facility site. Direct them to the Initial Contact position or appropriate location Do not allow any person to enter the medical facility without first encountering the Initial Contact position
Do not engage in a prolonged discussion with any person entering the facility.
Do not make physical contact with a person entering the facility. If physical contact is made, advise the Forward Unit leader immediately

Demobilization/System Recovery
Assist with the retrieval and return of all perimeter control equipment.
Do not leave your post until advised to do so by the Forward Unit Leader.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SITE LOGISTICS TASK LIST

Mission: Ensure all the equipment and materials needed to conduct victim decontamination is brought to the decon site.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Preparation Unit Leader: _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Ensure knowledge of control perimeters.
Review communication methods being used by Preparation Unit Leader.
Don appropriate PPE. (Level D is usually the initial ensemble.)
Locate the PPE needed by the Decon Services Unit. Transport this equipment to the team member PPE donning area.
Locate the decontamination equipment cache. Transport this equipment to the decontamination corridor area.
Ensure all ancillary products are located and transported to the designated site. Chairs __Victim Stripping __Patient Dressing __Team PPE Donning and Doffing area Victim Doffing Kits __Clothing bags __Personal items bag __Victim ID tags Victim Washing Materials __Soap __Wash clothes or sponges __Tepid water Patient Donning Kits __Drying towels __Patient body drape
Ensure back-up supply area is stocked with appropriate supplies. __Team member PPE __PAPR batteries __Victim doff kits __Washing materials __Drying towels __Patient drapes
Ensure Rehab area is stocked with appropriate materials and supplies. __Chairs __Med monitoring equip __Water __Shade __Warming or Cooling devices
Remain available until all equipment is at site and accounted for and you are directed to another assignment by the Decon Preparation Unit Leader.

Demobilization/System Recovery
Do not leave your post until all equipment is back in its assigned storage area and you are advised to do so by the Decon Preparation Unit Leader.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SITE SET-UP TASK LIST

Mission: Ensure all the equipment and materials needed to conduct victim decontamination is properly set up and made ready for use.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____
Position Reports to: Decon Preparation Unit Leader: _____

Task List
Receive appointment, briefing, and any appropriate materials.
Read this entire Task List Sheet.
Ensure knowledge of control perimeters.
Review communication methods being used by Preparation Unit Leader.
Locate the PPE in the designated Dressing Area. Organize the PPE into ensembles at each donning station
Locate the equipment in the Decontamination Reduction Corridor area. Place, erect, assemble and make ready the Corridor Ensure proper placement of all equipment as directed by Decon Preparation Unit Leader. Ensure a secure area for team member's personal items as directed by Decon Preparation Unit Leader
Ensure ancillary products are properly placed and ready for Decon Team use. Chairs __Victim Stripping __Patient Dressing __Team PPE Dressing area Victim Doffing Kits __Clothing bags __Personal items bags __Victim ID tags Victim Washing Materials __Soap __Sponges __Tepid water Patient Donning Kits __Drying towels __Patient body drape
Ensure back-up supply area is organized and ready to supply team members.
Ensure Rehab Area is organized and ready to accept team members.
Remain available until all equipment and areas are ready for use and you are directed to another assignment by the Decon Preparation Unit Leader.

Demobilization/System Recovery
Do not leave your post until advised to do so by the Decon Preparation Unit Leader.
Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

SITE SUPPORT TASK LIST

Mission: Ensure the entire decontamination reduction corridor and all Decon Team members have the equipment and support needed.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____

Position Reports to: Decon Preparation Unit Leader: _____

Task List

Receive appointment, briefing, and any appropriate materials.

Read this entire Task List Sheet.

Don appropriate PPE. (Level C is usual)
PAPR hood should be over shoulder ready to be donned immediately

Don appropriate unique identifier.

Review communication methods being used by Preparation Unit Leader.

Assume position at the Cold/Warm zone boundary

Remain available to assist with:
 RIT Site Logistics Equip repair/replace Non-Amb victim Monitoring
 Other duties

Remain available and assist others until you are directed to another assignment by the Preparation Unit Leader.

Demobilization/System Recovery

Do not leave your post until advised to do so by the Preparation Unit Leader.

Report to medical surveillance in collaboration with Employee Health & Well-Being Unit.

VICTIM DECONTAMINATION GROUP SUPERVISOR

Mission: Coordinate the on-site patient decontamination activities related to a hazardous material incident response. Coordinate with Decon Assistant Safety Officer and supervise Decon Facilities, Decon Forward and Decon Services Unit Leaders.

Date: _____ Start: _____ End: _____ Position Assigned to: _____ Initial: _____

Position Reports to: HazMat Branch Director Signature: _____

Hospital Command Center (HCC) Location: _____ Telephone: _____

Fax: _____ Other Contact Info: _____ Radio Title: _____

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
Receive appointment, briefing, and any appropriate materials from the Hazardous Materials Branch Director.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your HICS assignment.		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Appoint Victim Decontamination Group members. Preparation Unit Leader: _____ Forward Unit Leader: _____ Services Unit Leader: _____ Rapid Intervention Leader: _____		
Brief Unit members on current situation, incident objectives and strategy; outline Unit action plan; and designate time for next briefing.		
Ensure Unit members comply with safety policies and procedures and use appropriate personal protective equipment.		
Oversee the set-up of decontamination area to perform patient/precautionary/secondary, technical, and emergency decontamination for all ambulatory and non-ambulatory patients.		
Ensure medical monitoring of decontamination team members through [?].		
Ensure collection and security of patient valuables; coordinate with Security Branch Director.		
Ensure timely processing of patients through decontamination (consider 3-5 minutes for non-persistent viscous agent and 5-8 minutes for persistent/viscous or unknown agent).		
Ensure appropriate antidote supplies are delivered, coordinate with Clinical Support Services.		
Ensure proper wastewater collection and disposal, in compliance with recommendations		

Job Action Sheet

OPERATIONS SECTION
Hazardous Materials Branch
VICTIM DECON GROUP SUPERVISOR

Immediate (Operational Period 0-2 Hours) [Operational Periods are arbitrary and may vary by incident.] Tasks are not in order of execution.	Time	Initial
from water authority, emergency management, and local hazardous material team/fire department.		
Ensure mass decontamination system meets event needs.		
Ensure ongoing staff rotation.		
Coordinate any requests for external resources with Hazardous Materials Branch Director and Liaison Officer.		
Attend briefings and meetings as needed.		
Document all communications (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		

Intermediate (Operational Period 2-12 Hours)	Time	Initial
Meet regularly with the Hazardous Materials Branch Director for status reports, and relay important information to Unit Members.		
Ensure staff are rotated and replaced as needed.		
Ensure tracking of results of medical monitoring of staff; coordinate with the Employee Health & Well-Being Unit Leader.		
Ensure hazard monitoring continues and issues are addressed; coordinate with the Safety Officer.		
Ensure chain of custody of personal valuables in coordination with the Security Branch.		
Ensure decontamination supplies are replaced as needed.		
Prepare for the possibility of evacuation and/or the relocation of the decontamination area, if needed.		
Communicate status with external authorities, as appropriate through Hazardous Materials Branch Director and in coordination with the Liaison Officer.		
Develop and submit an action plan to the Hazardous Materials Branch Director when requested.		
Advise Hazardous Materials Branch Director immediately of any operational issue you are not able to correct or resolve.		

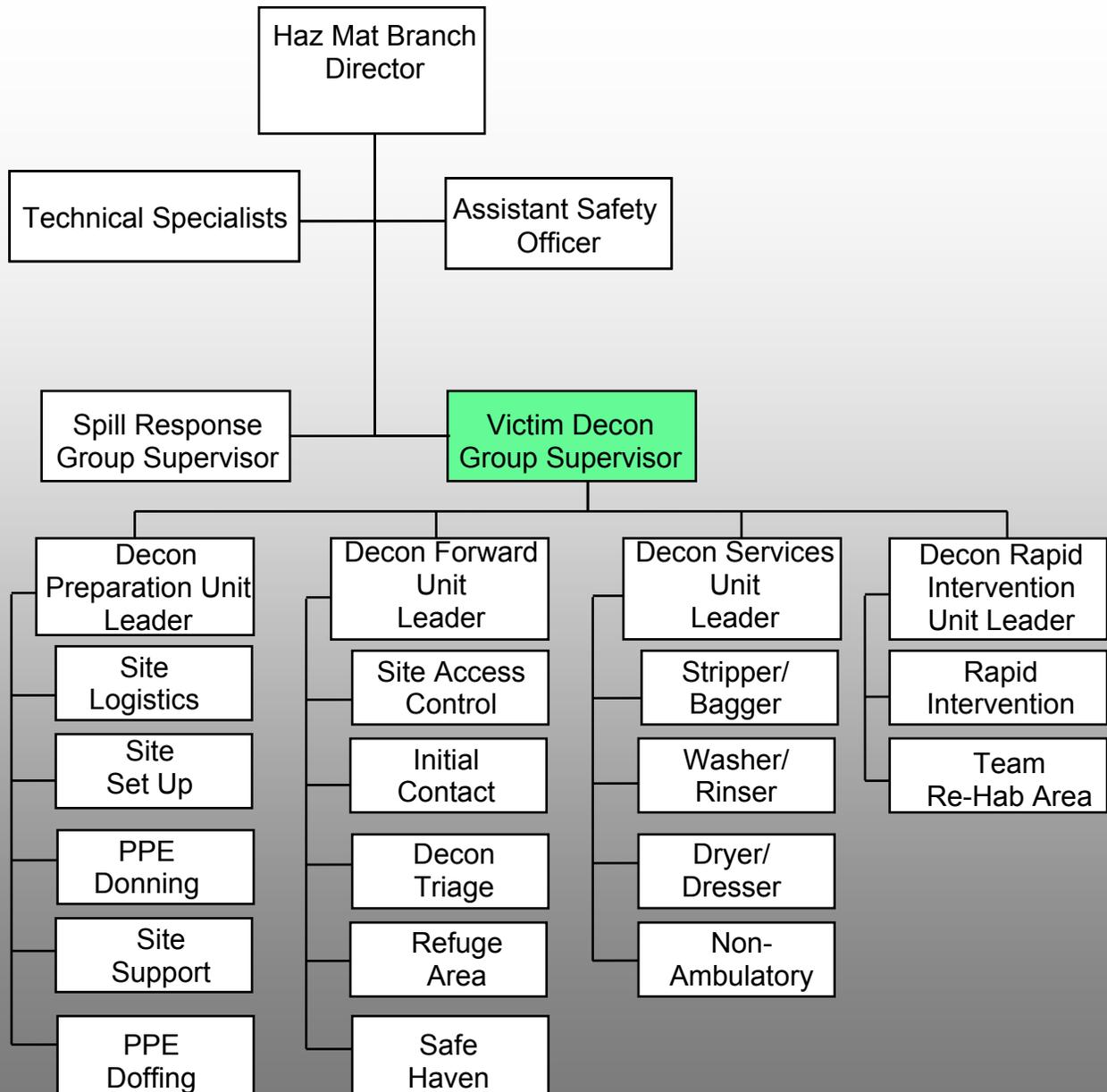
Demobilization/System Recovery	Time	Initial
As needs for the Group's staff decrease, return staff to their usual jobs and combine or deactivate positions in a phased manner.		
Ensure Victim Decontamination Group members are notified to terminate operations.		
Ensure decontamination equipment is cleaned, repaired, and replaced as warranted.		
Ensure disposable materials and wastes are properly managed.		
Address return of patient valuables with the Security Branch Director, law enforcement, fire department, and hazardous material team.		

Job Action Sheet

OPERATIONS SECTION
 Hazardous Materials Branch
VICTIM DECON GROUP SUPERVISOR

Demobilization/System Recovery	Time	Initial
Ensure the decontamination area is decontaminated, commensurate with agent risks.		
Ensure medical monitoring data on decontamination staff is collected and submitted to Employee Health & Well-Being Unit for review and entry into personnel health files.		
Ensure medical surveillance of decontamination staff is initiated as needed and/or per recommendations of internal/external experts, in collaboration with Employee Health & Well-Being Unit.		
Ensure return/retrieval of equipment and supplies and return all assigned incident command equipment.		
Notify Hazardous Materials Branch Director when clean-up/restoration is complete.		
Debrief staff on lessons learned and procedural/equipment changes needed.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Hazardous Materials Branch Director or Operations Section Chief, as appropriate.		
Upon deactivation of your position, brief the Hazardous Materials Branch Director or Operations Section Chief, as appropriate, on current problems, outstanding issues, and follow-up requirements.		
Submit comments to the Hazardous Materials Branch Director for discussion and possible inclusion in the after-action report; topics include: <ul style="list-style-type: none"> • Review of pertinent position descriptions and operational checklists • Recommendations for procedure changes • Section accomplishments and issues 		
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

Documents/Tools
<ul style="list-style-type: none"> • Incident Action Plan • HICS Form 204 – Branch Assignment List • HICS Form 207 – Incident Management Team Chart • HICS Form 213 – Incident Message Form • HICS Form 214 – Operational Log • Hospital emergency operations plan • Hospital patient decontamination plan (e.g., decontamination area drawings, procedures, and documentation logs) • Material Safety Data Sheets (MSDS) • Hospital organization chart • Hospital telephone directory • Radio/satellite phone



Emergency Decon

Children Less than 2 Years of Age

Infants and toddlers represent the most challenging group to safely decontaminate due to their developmental stage, their dependent nature and their physical characteristics. These special needs and considerations are the most important:

- All infants and toddlers should be placed on a stretcher, gurney or designated decon conveyor for non-ambulatory patients or into something that will not allow them to roll off or fall, such as a Stokes Basket or potentially even a plastic laundry basket designated for infant decon. The infant or toddler should be disrobed by either the child's caregiver or Decon Team personnel. (Use trauma shears, if necessary, to speed the disrobing process.)
- A hand should be kept on the infant or toddler **at all times**, even when bedrails are raised. (Small children can fall through.) Some have found plastic laundry baskets to be useful in moving infants through the decontamination area.
- It is not recommended that the child be carried due to the possibility of injury resulting from a fall, or from dropping a scared, slippery and squirming child.
- All clothes and items that cannot be decontaminated should be placed in appropriate containers or bags as provided by the hospital and labeled.
- Ensure the temperature of the shower does not present a danger to the infant/toddler.
- Each infant and toddler should then be accompanied through the decontamination shower by either his or her caregiver or Decon Team personnel to ensure the entire patient is properly decontaminated.
- Special attention must be given to the child's airway while in the shower.
- Children and their families (parents or caregivers) **should not** be separated unless critical medical issues take priority.
- Once through the shower, the infant's or toddler's caregiver or 'cold zone' personnel escort should be given a towel and sheets to dry off the child, and post decon gown to dress the child. Immediately, the child should be given a unique identification number on a wristband and then triaged to an appropriate area for medical evaluation.
- Remember that temperature regulation is a major issue for infants and toddlers. If necessary, cover the child with a blanket to prevent hypothermia.



Emergency Decon

Pregnant Patients

Pregnant patients represent a challenging group to safely decontaminate due to what their body goes through during pregnancy and also that the fetus that is developing must also be considered. Sort these patients into the traditional **Ambulatory** and **Non-Ambulatory** categories, however also take these special needs into consideration:

- Pregnant patients may have:
 - Decreased or altered mobility and may need assistance with Self Decon and have a high risk of slip, trip and fall hazards.
 - Attempt to keep the Non-Ambulatory pregnant patient tilted on either side to prevent the fetus from placing pressure on the aorta when the mother is flat on her
 - Metabolic changes during pregnancy can increase/decrease the elimination half-life of chemical agents
 - Pregnancy can lead to increased amount of air breathed per minute, possible increasing exposure to chemical agents.
 - Conditions due to pregnancy, such as gestational diabetes or preeclampsia, can increase the pregnant patient's susceptibility to certain chemical agents.
 - Due to pregnancy, may consider to make every effort of triaging the patients into a higher level for evaluation by provider in a more rapid fashion if any signs and symptoms of toxidrome or potential other complications with the pregnancy due to the incident.
- The fetus may have:
 - More frequent cell division during development can result in enhanced fixation of mutations due to chemical and radioactive agents, so make every effort to remove contamination safely and quickly.
 - Induction of developmental abnormalities can result in a predisposition to carcinogenic effects later in life due to chemical and radiological agents.
 - A number of chemical agents have known embryo and fetal toxicity.
 - Chemical agents and/or treatment effects on the mother (acidosis) can adversely affect the fetus, including fetal development and the oxygenation of the fetus.



Emergency Decon

Working and Service Animals

Working animals are considered responders and are processed through the decontamination station. Service animals meet ADA Requirements and are processed through the decontamination station. Also, in some occasions owners may be involved in a disaster and will not leave their pets, which leads them both to potential contamination.

- Individuals with animals, Working and/or Service animals should be instructed to remove collars, leashes and other equipment by Decon Team personnel. Designate a Equipment drop area where equipment (leashes, muzzles, leads, etc.) can be dropped and decontaminated and should be placed in appropriate containers or bags as provided by the hospital and labeled.
- Animal owners should not decontaminate their own animals. If the owner is also contaminated it is important that they themselves be effectively decontaminated, something that is less likely to occur if they are instead participating in the decontamination of their animals.
- In order to provide comfort and reassurance to an animal owner that does not want to become separated from their animal, the owner and animal(s) should be commonly identified before proceeding through the respective decontamination lines so they can be more easily reunited afterwards.
- For decon, animals can utilize a pop pool for decon or can be taken through the designated decon shower with the other human patients. However, it is important to realize that the animal may be scared, therefore a risk to the Decon Team personnel and risk to tearing the PPE. It is important to remain calm with the animal and decon them in the least loud or scary environment.
- Each Working and/or Service animal should then be taken through the decontamination shower.
- Once through the shower, each animal should be dried and immediately, the animal should be given a unique identification number on a wristband placed around the leg or other accessible location. This number should match the triage or identification number assigned to their owner.
- Veterinary evaluation station (exit point to the cold zone where veterinary medical personnel may attend to illnesses or injuries of the animal(s) and monitor for hypo- and hyperthermia); and a Recovery and rehabilitation station (animals and humans need periodic rest times in order to prepare to return to home, the mission, or home) may be designated in a location in the cold zone, however is not required.

In the case of individuals with **Working Dogs** or **Service Animals**:

- **Working dogs**- Sometimes are not safely separated from their handlers and search-and-rescue or other detection dogs (bombs, cadaver, arson, etc.) may belong to handlers who are themselves hazmat-trained, emergency first responders.
- **Service animals**- Removing them from their owner may not be possible due to the severe distress this may cause both individuals in an already stressful situation. In these cases, normal human decontamination procedures will need to be altered to accommodate them.



APPENDIX

OSHA BEST PRACTICES

for

HOSPITAL-BASED FIRST RECEIVERS OF VICTIMS from Mass Casualty Incidents Involving the Release of Hazardous Substances



January 2005





Executive Summary

Healthcare workers risk occupational exposures to chemical, biological, or radiological materials when a hospital receives contaminated patients, particularly during mass casualty incidents. These hospital employees, who may be termed *first receivers*, work at a site remote from the location where the hazardous substance release occurred.¹ This means that their exposures are limited to the substances transported to the hospital on victims' skin, hair, clothing, or personal effects (Horton et al., 2003). The location and limited source of contaminant distinguishes first receivers from other first responders (e.g., firefighters, law enforcement, and ambulance service personnel), who typically respond to the incident site (i.e., the Release Zone).

In order to protect their employees, hospitals benefit from information to assist them in emergency planning for incidents involving hazardous substances (BNA, 2003; Barbera and Macintyre, 2003). Emergency first responders, at the site of the release, are covered under OSHA's Standard on Hazardous Waste Operations and Emergency Response (HAZWOPER), or the parallel OSHA-approved State Plan standards, and depending on their roles, some hospital employees also are covered by the standard.^{2,3} However, OSHA recognizes that first receivers have somewhat different training and personal protective equipment (PPE) needs than workers in the hazardous substance Release Zone, a point clarified through letters of interpretation (OSHA, 2002a).

In this best practices document, OSHA provides practical information to help hospitals address employee protection and training as part of emergency planning for mass casualty incidents involving hazardous substances. OSHA considers sound planning the first line of defense in all types of emergencies (including emergencies involving chemical, biological, or radiological substances). By tailoring emergency plans to reflect the reasonably predictable "worst-case" scenario under which first

¹ *Hazardous substance* is defined as any substance to which exposure may result in adverse effects on the health or safety of employees. This includes substances defined under Section 101(14) of CERCLA; biological or disease-causing agents that may reasonably be anticipated to cause death, disease, or other health problems; any substance listed by the U.S. Department of Transportation as hazardous material under 49 CFR 172.101 and appendices; and substances classified as *hazardous waste*.

² [29 CFR 1910.120](#).

³ First responders, including firefighters, law enforcement, and emergency medical personnel, and many first receivers at public hospitals, are usually employees of local, municipal, or state governments. Although Federal OSHA's standards and enforcement authority do not extend to such state and local governments, these employers and employees are covered by the 26 states that operate OSHA-approved State Plans and, in states without State Plans, by the Environmental Protection Agency (EPA) with regard to HAZWOPER ([29 CFR 1910.120](#)). State Plan states set and enforce standards, such as the HAZWOPER and Respiratory Protection standards, which are identical to or "at least as effective as" Federal OSHA standards, and therefore may have more stringent or supplemental requirements. EPA's HAZWOPER parallel standard was adopted to cover emergency responders who would not be covered by the OSHA standard, including volunteers who work for a governmental agency engaged in emergency response, such as firefighters. For consistency, OSHA interprets the HAZWOPER Standard for the EPA. Federal OSHA administers the safety and health program for the private sector in the remaining states and territories, and also retains authority with regard to safety and health conditions for federal employees throughout the nation (OSHA, 1991c).



receivers might work, the hospital can rely on these plans to guide decisions regarding personnel training and PPE (OSHA, 2003, 2002b, 1999). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires an all-hazard approach to allow organizations to be flexible enough⁴ to respond to emergencies of all types, whether natural or manmade (unintentional or intentional).

Worst-case scenarios take into account challenges associated with communication, resources, and victims. During mass casualty emergencies, hospitals can anticipate little or no warning before victims begin arriving.⁵ Additionally, first receivers can anticipate that information regarding the hazardous agent(s) would not be available immediately. Hospitals also can anticipate a large number of self-referred victims (as many as 80 percent of the total number of victims) and assume victims will not have been decontaminated prior to arriving at the hospital (Auf der Heide, 2002; Barbera and Macintyre, 2003; Vogt, 2002; Okumura et al., 1996).

The appropriate employee training and PPE selection processes are defined in applicable OSHA standards.⁶ An employee's role and the hazards that an employee might encounter dictate the level of training that must be provided to any individual first receiver. PPE selection must be based on a hazard assessment that carefully considers both of these factors, along with the steps taken to minimize the extent of the employee's contact with hazardous substances.

Despite many hospitals' strong interest in powered air-purifying respirators (PAPRs) as a practical form of respiratory protection for first receivers in the Hospital Decontamination Zone, many knowledgeable sources avoid making specific PPE recommendations, but rather point out the advantages and disadvantages of the various options, or recommend *appropriate* PPE (JCAHO, 2001; Lehmann, 2002; Penn, 2002). Others offer stronger opinions. CA EMSA (2003a) promotes the use of a multi-tiered approach to PPE. Burgess (1999) indicates, in an article published prior to more recent letters of interpretation specific to healthcare workers, that OSHA requires Level B protection or self-contained breathing apparatus (SCBA) for unknown hazards, but points out there are substantial difficulties for healthcare workers who attempt to care for patients while wearing this type of equipment and also addresses the hazards of wearing SCBAs (e.g., slips, trips, falls, and overexertion, particularly for

⁴ Note: Footnotes at relevant points in the text indicate current JCAHO Standards for Emergency Management, which are further described in Section EC 1.4 of JCAHO's Comprehensive Accreditation Manual (JCAHO, 2004).

⁵ *Mass casualty* may be defined as "a combination of patient numbers and patient care requirements that challenges or exceeds a community's ability to provide adequate patient care using day-to-day operations" (Barbera and Macintyre, 2003).

⁶ Applicable OSHA standards include: [29 CFR 1910.120](#) – HAZWOPER; [29 CFR 1910.132](#) – Personal Protective Equipment – General Requirements; [29 CFR 1910.133](#) – Eye and Face Protection; [29 CFR 1910.134](#) – Respiratory Protection.



infrequent users of this equipment). These sources demonstrate appropriate caution in the face of unknown contaminants of unknown concentration. However, OSHA believes that the substantial body of recent information on first receivers' actual experiences and probable exposure levels now allows more definitive guidance.

In this best practices document, OSHA specifies PPE that hospitals could use to effectively protect first receivers assisting victims contaminated with *unknown substances*, provided the hospital meets certain prerequisite conditions designed to minimize the quantity of substance to which first receivers might be exposed. This PPE for first receivers includes: a PAPR with an assigned protection factor of 1,000, a chemical-resistant protective garment, head covering if it is not already included in the respirator, a double layer of protective gloves, and chemical-protective boots (see Table 3, Section B.3). As part of OSHA's required hazard assessment process, each hospital also must consider the specific hazards first receivers might reasonably be expected to encounter⁷ The hospital must then augment OSHA's PPE selection when necessary to provide adequate protection against those specific identified hazards.

The specified PPE is appropriate when the hazardous substance is unknown and the concentration is strictly limited by 1) the quantity of material associated with living victims *and* 2) the conditions, policies, equipment, and procedures that are in place and that will reduce employee exposure. Tables 1 and 2 of the best practices document list those specific prerequisites that OSHA believes are necessary to adequately limit first receiver exposures and to assure the adequacy of the PPE presented in Table 3. Such conditions include a current Hazard Vulnerability Analysis (HVA) and emergency management plan (EMP), as well as procedures to ensure that contaminated materials are removed from the area and contained so they do not present a continuing source of exposure.

The first receiver PPE listed in Table 3 is not the only option for first receivers. Employees at hospitals that do not meet the criteria shown in Tables 1 and 2 must determine whether more protective equipment is required (e.g., HAZWOPER Level B). A higher level of protection also may be necessary for any hospital that anticipates providing specialized services (such as Hazardous Materials Response Team at the incident site). Additionally, if a hospital is responding to a known hazard, the hospital must

⁷ These specific hazards will be identified in the hospital's hazard vulnerability analysis (HVA). JCAHO Standards for Emergency Management require hospitals to: 1) develop a comprehensive emergency management plan (EMP) describing the hospital's response to emergencies that would affect the need for the hospital's services or the hospital's ability to provide these services; 2) evaluate the EMP annually including the objectives, scope, functionality, and effectiveness; 3) conduct an HVA, to identify potential emergencies that could affect the need for the hospital's services, or its ability to provide these services; and 4) identify the hospital's role in the community and coordinate plans.



ensure that the selected PPE adequately protects the employees from the identified hazard. Thus, hospitals must augment or modify the PPE in Table 3 if the specified PPE is not sufficient to protect employees from the identified hazard. Alternatively, if a hazard assessment demonstrates that the specified PPE is not necessary to effectively protect workers from the identified hazard, a hospital would be justified in selecting less protective PPE, as long as the PPE actually selected by the hospital provides effective protection against the hazard.

This best practices document provides hospitals and other health care providers with information to assist in the provision of PPE and training for first receivers. Section A introduces the subject, while section B provides a detailed analysis of potential hazards, as well as a comprehensive discussion of the PPE currently available to protect workers from these hazards. In Section B.3, OSHA provides three tables designed to assist employers in selecting PPE adequate to protect healthcare workers and to comply with relevant OSHA PPE standards. Employers who meet the prerequisites in Tables 1 and 2 may use this best practices document as the OSHA-required generalized hazard assessment. Such employers may choose to rely on the PPE specified in Table 3 to comply with relevant OSHA standards and to provide effective protection for first receivers against a wide range of hazardous substances. However, such employers also must conduct a hazard assessment that considers hazards unique to the community in which they are located. In rare situations, these employers will need to augment or modify the PPE specified in Table 3 to provide adequate protection against unique hazards identified in the community-specific hazard analysis. Of course, employers are not obligated to follow the guidance in Table 3; any employer can choose instead to perform an independent hazard assessment that is sufficient to identify the hazards that its employees are reasonably anticipated to encounter, and then select PPE adequate to protect its employees against such hazards. Section C of this best practices document contains a discussion of training required for first receivers and concludes with Table 4, which matches required training levels to employee roles and work areas.

Appendix A of this best practices document provides background information on how various aspects of a hospital's preparation, response, and recovery impact employee protection during hazardous substance emergencies. Appendices B, C, and D list additional information sources, while Appendices E through M offer examples of procedures and equipment used in some hospitals. OSHA offers these examples for informational purposes only and does not recommend one option over the many effective alternatives that exist. Emergency managers might find these resources helpful in developing or updating existing EMPs.



This document is based on presently available information, as well as current occupational safety and health provisions and standards. Employers should modify their procedures as appropriate, when additional, relevant information becomes available or when modifications to Occupational Safety and Health Act (OSH Act) or JCAHO standards necessitate revision. The OSH Act requires employers to comply with hazard-specific safety and health standards. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the OSH Act, employers must provide their employees with a workplace free from recognized hazards, likely to cause death or serious physical harm. This document incorporates existing applicable regulatory provisions, as well as non-mandatory work practices and methods that may be implemented to further supplement employee protection against exposure to hazardous substances. OSHA has attempted to clearly distinguish between mandatory and recommended work practices/methods within this document. Where regulations establish performance criteria for compliance, this document attempts to provide specific guidance that employers may use to adequately protect employees and comply with these regulatory provisions. However, an alternative approach may be justified given specific workplace circumstances. This document does not enlarge or diminish an employer's obligation under the OSH Act.



Best Practices From OSHA

- 1 **INTRODUCTION**
- 2 **BACKGROUND**

Healthcare workers risk occupational exposure to chemical, biological, or radiological materials when hospitals receive patients contaminated with these substances during mass casualty incidents (Horton et al., 2003).⁸ Such incidents could be associated with manmade (intentional or unintentional) or natural disasters and can involve a wide range of hazardous substances—from chemical weapons agents to toxic industrial chemicals (Horton et al., 2003).

A.2 DEFINING “FIRST RECEIVERS”

Healthcare workers at a hospital receiving contaminated victims for treatment may be termed *first receivers* (Koenig, 2003). This group is a subset of *first responders* (e.g., firefighters, law enforcement, HAZMAT teams, and ambulance service personnel). However, most first responders typically act at the site of an incident (i.e., the location at which the primary release occurred). In contrast, inherent to the definition of *first receivers*, is an assumption that the hospital is not itself the primary incident site, but rather is remote from the location where the hazardous substance release occurred. Thus, the possible exposure of first receivers is limited to the quantity of substance arriving at the hospital as a contaminant on victims and their clothing or personal effects (Horton et al., 2003).

First receivers typically include personnel in the following roles: clinicians and other hospital staff who have a role in receiving and treating contaminated victims (e.g., triage, decontamination, medical treatment, and security) and those whose roles support these functions (e.g., set up and patient tracking).⁹

⁸ For the purposes of this guidance, OSHA uses the definition of *mass casualty* provided by Barbera and Macintyre (2003): “A combination of patient numbers and patient care requirements that challenges or exceeds a community’s ability to provide adequate patient care using day-to-day operations.”

⁹ The term *clinician* refers to physicians, nurses, nurse practitioners, physicians’ assistants, and others.



SCOPE AND OBJECTIVES

In order to protect their employees, hospitals benefit from information to assist them in emergency planning for incidents involving hazardous substances (BNA, 2003; Barbera and Macintyre, 2003). Emergency first responders at the scene of the incident, including fire, law enforcement, and emergency medical personnel, are covered by the requirements of OSHA's Standard on Hazardous Waste Operations and Emergency Response (HAZWOPER), or by parallel state standards in states with OSHA-approved State Plans.^{10,11} However, the extent of the hazard to the hospital-based first receivers (a subgroup of first responders) can differ from that at the release site. A series of OSHA letters of interpretation clarifies when and how the HAZWOPER Standard applies to first receivers. This best practices document provides information useful to employers attempting to provide adequate protection for hospital-based first receivers during mass casualty incidents involving hazardous substances.

Specifically, this best practices document covers protection for first receivers during releases of chemicals, radiological particles, and biological agents (overt releases) that produce victims who may need decontamination prior to administration of medical care. Although intended for mass casualty incidents as they affect emergency department personnel at fixed hospitals, the basic principles and concepts of this guidance also apply to mobile casualty care facilities and temporary shelters, such as would be necessary in the event of a catastrophic incident involving tens or hundreds of thousands of victims.

The scope of this best practices document does *not* include situations where the hospital (or temporary facility) is the site of the release. Nor does it include infectious outbreaks for which victim decontamination is *not* necessary.

¹⁰ HAZWOPER [29 CFR 1910.120](#).

¹¹ First responders, including firefighters, law enforcement and emergency medical personnel, and many first receivers at public hospitals, are usually employees of local, municipal or state governments. Although Federal OSHA's standards and enforcement authority do not extend to such state and local governments, these employers and employees are covered by the 26 states that operate OSHA-approved State Plans and, in states without State Plans, by the Environmental Protection Agency (EPA) with regard to HAZWOPER ([29 CFR 1910.120](#)). State Plan states set and enforce standards, such as the HAZWOPER and Respiratory Protection standards, which are identical to or "at least as effective as" Federal OSHA standards, and therefore may have more stringent or supplemental requirements. EPA's parallel HAZWOPER Standard was adopted to cover emergency responders who would not be covered by the OSHA standard, including volunteers who work for a governmental agency engaged in emergency response, such as firefighters. For consistency, OSHA interprets the HAZWOPER Standard for the EPA. Federal OSHA administers the safety and health program for the private sector in the remaining states and territories, and also retains authority with regard to safety and health conditions for federal employees throughout the nation.



**PATIENT DECONTAMINATION
RECOMMENDATIONS FOExcerptsR HOSPITALS
Excerpts**

Prepared by:

The Hospital and Healthcare System
Disaster Interest Group

And

The California Emergency Medical Services Authority



PATIENT DECONTAMINATION RECOMMENDATIONS FOR HOSPITALS

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*The California Hospital and Healthcare System Disaster Interest Group wishes to thank the State of California Water Resources Control Board and the Regional Water Quality Control Board (Region 5) for their guidance and collaboration in preparing and reviewing the information presented in Chapter V of this document (Water Containment and Run-Off)



Hospital and Health System Disaster Interest Group
Emergency Medical Services Authority

PATIENT DECONTAMINATION RECOMMENDATIONS FOR HOSPITALS

I. Introduction

This document provides recommendations for protecting healthcare providers and managing patients in the event of a hazardous materials exposure. Content was compiled through nationally recognized, current practice standards and formatted into user-friendly materials. In addition, compliance with regulatory agencies such as the California Occupational Safety and Health Administration (Cal-OSHA), State of California Water Resources Control Board and the National Institute for Occupational Safety and Health (NIOSH) were considered. These recommendations, developed for hospitals by hospital experts, will be revised and updated as indicated by practice or need.

The Emergency Medical Services Authority wishes to thank the members of the Disaster Interest Group Committee for their contributions in developing these materials.

General Recommendations for Hospitals

1. The algorithms in this document are not intended to stand alone, but to be part of an overall emergency management plan for decontamination and should be customized to meet the needs of the healthcare facility.
2. Hospitals must regularly assess the risks to the community and perform a hazards vulnerability analysis. The level of equipment and staff protection must be based on this analysis.¹
3. Hospitals are encouraged to establish relationships and notification procedures with appropriate local agencies (e.g. local EMS and public health) in order to:
 - a. Ensure communication between the field and the hospital to allow for facility preparation.
 - b. Ensure that properly trained and equipped field/prehospital responders decontaminate patients in the field in order to protect the hospital as much as possible.
 - c. Understand the local protocols and capabilities for field decontamination of patients.
 - d. Ensure proper notification of an event to appropriate local agencies.
4. The primary role of the hospital in a hazardous materials event is to triage, treat, decontaminate and medically screen patients as necessary.

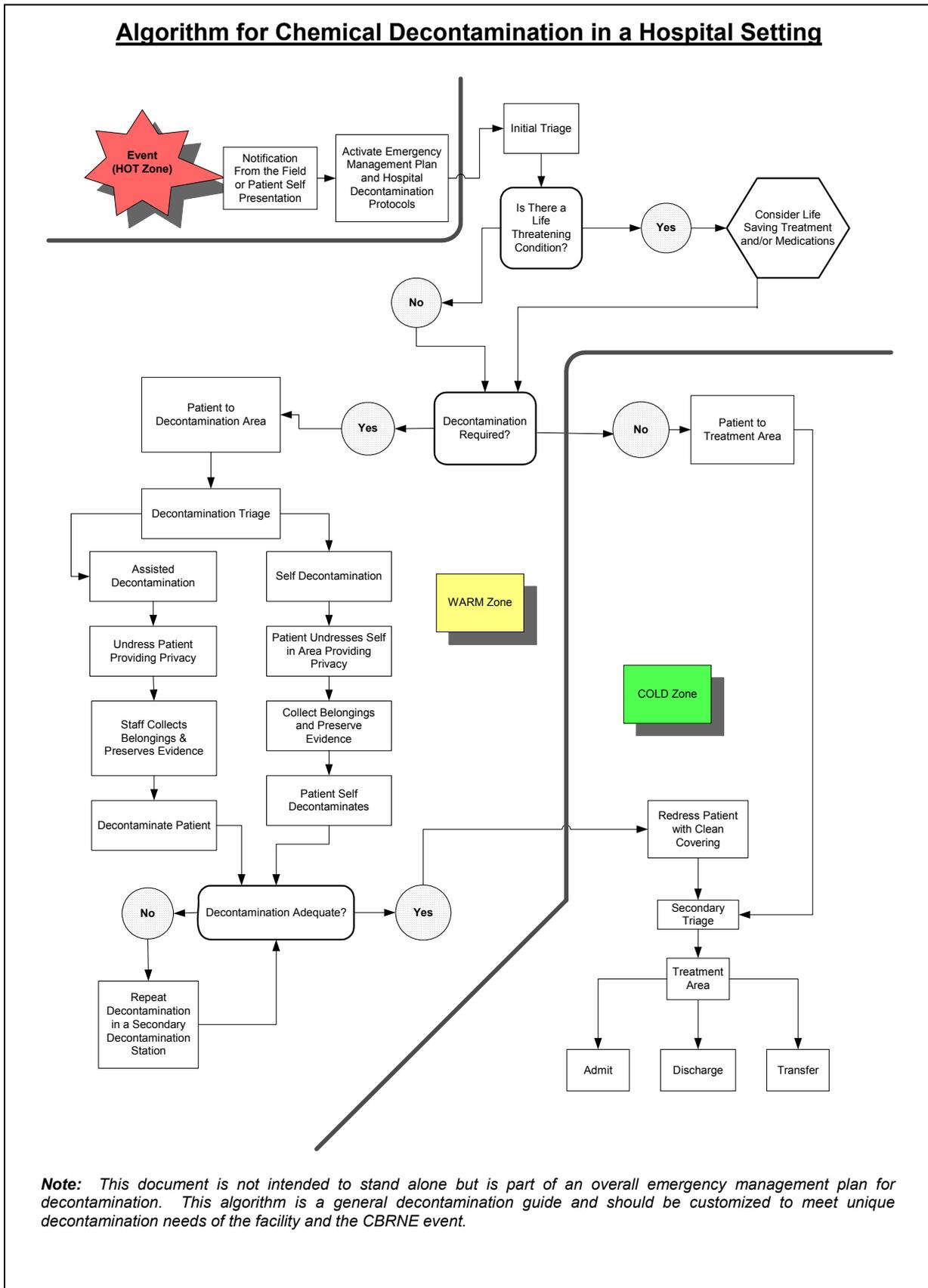
¹ Joint Commission on Accreditation of Healthcare Organizations, Environment of Care Standard (EC) 4.0, January 1, 2004.

- a. An influx of contaminated patients will overwhelm any hospital and therefore hospitals must work collaboratively with community hospitals and local government to meet the challenges of a surge of contaminated patients.
- b. Hospitals must be prepared for potentially contaminated patients who self-refer and present to the hospital.
- c. Additional planning considerations may include:
 - Establishing a “fast track” decontamination line for patients with severe or life threatening symptoms, delivering basic life saving treatment during decontamination if time and situation allow. **Note** the exception for Radiological decontamination in which emergency treatment takes precedence over Radiological decontamination.
 - Establishing a separate decontamination area for patients that require secondary and /or technical decontamination if primary decontamination is not adequate.
 - Establishing a separate “lane” for patients arriving by EMS transport that have been decontaminated on scene so that these patients can be quickly assessed for adequacy of decontamination and be triaged to medical screening more quickly.

Comparative Table of Terminology for Contamination Zones					
Description	Agency				
	USEPA/ USCG/ NIOSH/ OSHA*	Colloquial Term			OSHA First Receivers
Site of release/ Highest level of contamination	Exclusion Zone	Hot Zone	Red Zone	Dirty Zone	
Buffer/ Where decon occurs	Contamination Reduction Zone (Decon takes place in the Contamination Reduction Corridor)	Warm Zone	Yellow Zone	Less Dirty Zone	Hospital Decontamination Zone
Uncontaminated	Support Zone	Cold Zone	Blue or Green Zone	Clean Zone	Hospital Post-Decontamination Zone

* Taken from “Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities”, NIOSH/ OSHA/ USCG/ EPA, October 1985 (Four-Agency Document). This is the original document upon which HAZWOPER was based and is still considered a definitive text.

II. Chemical Decontamination



MINIMUM STAFF PROTECTION IN CHEMICAL DECONTAMINATION		
LEVEL OF PROTECTION	PPE	TRAINING
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;"> MINIMUM PROTECTION PPE Level: D </div> <p>Level D is the minimum level of PPE required for securing, isolating, and denying entry of an ambulatory victim.</p> <p>These PPE recommendations provide minimal protection, and act primarily as a barrier in the following situations:</p> <ul style="list-style-type: none"> ✓ No staff contact or exposure to the contaminant is anticipated ✓ The chemical is known <u>and</u> is a low risk contaminant <p>Decontamination should be performed outdoors or in a well ventilated area.</p> <p>The patient must be ambulatory and able to fully understand and perform self- decontamination.</p>	<p>PPE = Personal Protective Equipment</p> <p><u>LIQUID SPLASH PROTECTION</u></p> <ul style="list-style-type: none"> ✓ Full face shield ✓ Hood or hair covering ✓ Gloves ✓ Water-repellant gown ✓ Water repellent boots / shoes covers <p><u>RESPIRATORY PROTECTION</u></p> <ul style="list-style-type: none"> ✓ No respiratory protection needed for chemical decontamination 	<ul style="list-style-type: none"> ✓ Awareness Training <p>Awareness training should be structured pursuant to applicable hazardous waste operations and emergency response standards, which may include:</p> <ul style="list-style-type: none"> ▪ An understanding of what hazardous substances are, and the risks associated with them in an incident. ▪ An understanding of the potential outcomes associated with an emergency created when hazardous substances are present. ▪ The ability to recognize the presence of hazardous substances in an emergency. ▪ The ability to identify the hazardous substances, if possible. ▪ An understanding of the role of the first responder in the employer's emergency response plan (including site security and control), and the U. S. Department of Transportation's Emergency Response Guidebook. ▪ The ability to realize the need for additional resources, and to make appropriate notifications to the communication center. <ul style="list-style-type: none"> ✓ Self Decontamination module ✓ Hospital-specific decontamination policy and procedure training

PREFERRED STAFF PROTECTION IN CHEMICAL DECONTAMINATION		
LEVEL OF PROTECTION	PPE	TRAINING
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;"> PREFERRED PROTECTION PPE Level: C </div> <p>These preferred PPE recommendations provide hazardous materials protection in the following situations:</p> <ul style="list-style-type: none"> ✓ Non-ambulatory patients or ambulatory patients requiring direct assistance. ✓ Potential or actual staff contact or exposure to the contaminant is anticipated ✓ For decontamination purposes, Level C is adequate unless there is a known contraindication for the filter cartridge in the PAPR or APR. <p>Note: If the event or the chemical exposure exceeds the preferred protection and safe patient decontamination, and staff protection cannot be assured, policy decisions should include:</p> <ul style="list-style-type: none"> ✓ Remove staff and uncontaminated patients from the area and do not provide decontamination. Lock down of facility to protect patients and staff may be required. ✓ Call for assistance from 9-1-1 or hazardous materials teams. ✓ Provide personal protective equipment listed in "Specialized Protection". 	<p>PPE = Personal Protective Equipment</p> <p style="text-align: center;"><u>LIQUID SPLASH PROTECTION</u></p> <ul style="list-style-type: none"> ✓ Full face shield ✓ Chemical-resistant gloves* ✓ Chemical-resistant suit* ✓ Waterproof, chemical-resistant boots* <p style="text-align: center;"><u>RESPIRATORY PROTECTION</u></p> <ul style="list-style-type: none"> ✓ Powered Air Purifying Respirator (PAPR) with loose fitting hood and appropriate filter cartridge* <i>or</i> ✓ Air Purifying Respirator (APR) with appropriate filter cartridge* <p style="text-align: center;"><i>or</i></p> <ul style="list-style-type: none"> ✓ Supplied Air Respirator (SAR) with loose fitting hood <p>* Note: The selection of specific types of cartridges or filters, chemical resistant suits, gloves and boots are determined by the contaminant to which exposure is encountered. The type of equipment obtained and utilized by the hospital should be based on the hazard vulnerability analysis and community risk.</p> <p style="text-align: center;"><i>All respiratory PPE plans should include staff monitoring pre-event, during, and post-event</i></p>	<ul style="list-style-type: none"> ✓ Operations Training should be structured pursuant to applicable hazardous waste operations and emergency response standards, which may include: <ul style="list-style-type: none"> ▪ Knowledge of the basic hazard and risk assessment techniques. ▪ Know how to select and use proper PPE provided to the first responder operational level. ▪ An understanding of basic hazardous materials terms. ▪ Know how to perform basic control, containment, and/or confinement operations and rescue injured or contaminated persons within the capabilities of the resources and PPE available with their unit. ▪ Know how to implement basic equipment, victim, and rescue personnel decontamination procedures. ▪ An understanding of the relevant standard operating procedures and termination procedures. ✓ Awareness Training as outlined under Minimum Level Protection ✓ Respiratory protection program (OSHA) ✓ Hospital-specific decontamination policy and procedure training

SPECIALIZED STAFF PROTECTION IN CHEMICAL DECONTAMINATION		
LEVEL OF PROTECTION	PPE	TRAINING
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;"> <u>SPECIALIZED PROTECTION</u> PPE Level: B or A </div> <p>These PPE recommendations provide the specialized hazardous materials protection in the following situations:</p> <ul style="list-style-type: none"> ✓ Potential or actual staff contact with patient or contaminant is anticipated ✓ There is a known contraindication for the use of the PAPR or APR <p>The provision by each facility of specialized personal protection should be based on:</p> <ul style="list-style-type: none"> ✓ Hazard Vulnerability Assessment ✓ Community Risk ✓ Facility choice to enhance the facility capacity 	<p>PPE = Personal Protective Equipment</p> <p style="text-align: center;"><u>LIQUID SPLASH PROTECTION</u></p> <p>Level A</p> <ul style="list-style-type: none"> ✓ Vapor protective suit <p>Level B</p> <ul style="list-style-type: none"> ✓ Chemical-resistant suit* with hood ✓ Chemical-resistant gloves* and boots* <p>Level A & B</p> <ul style="list-style-type: none"> ✓ Waterproof-chemical resistant boots* <p style="text-align: center;"><u>RESPIRATORY PROTECTION</u></p> <ul style="list-style-type: none"> ✓ Atmosphere supplying respirator (ASR) such as: <ul style="list-style-type: none"> . Supplied Air Respirator (SAR) <li style="text-align: center;"><i>or</i> . Self-Contained Breathing Apparatus (SCBA) <p>* Note: The selection of specific types of chemical resistant suits, gloves and boots is determined by the contaminant to which exposure is encountered. The type of equipment obtained and utilized by the hospital should be based on the hazard vulnerability analysis and community risk.</p> <p style="text-align: center;"><i>All respiratory PPE plans should include staff monitoring pre-event, during, and post-event</i></p>	<ul style="list-style-type: none"> ✓ Awareness Training as outlined under Minimum Level training ✓ Operations training as outlined under Preferred Level Training ✓ Respiratory protection program (OSHA) as outlined under Preferred Level Training ✓ Hospital-specific decontamination policy and procedure training ✓ Technician Level training and competencies as outlined in: <p style="margin-left: 20px;">California Code of Regulations Title 8 Section 5192 Q</p>

RECOMMENDED EQUIPMENT FOR PATIENT DECONTAMINATION	
MINIMUM LEVEL EQUIPMENT	<p style="text-align: center;"><u>Staff Personal Protective Equipment (PPE)</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Full face shield (for inadvertent facial contact contamination) <input type="checkbox"/> Hood or hair covering <input type="checkbox"/> Gloves <input type="checkbox"/> Water-repellant gown <input type="checkbox"/> Water repellant boots / shoe covers <p style="text-align: center;"><u>Equipment</u></p> <p><u>Patient Identification and Belongings</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Waterproof triage tags <input type="checkbox"/> Sealable plastic bags, size small and large to accommodate belongings and clothing <input type="checkbox"/> Labels <input type="checkbox"/> Permanent marker <p><u>Decontamination Supplies:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Mild soap <input type="checkbox"/> Sterile Saline to irrigate wounds <input type="checkbox"/> Sponges / Sterile Gauze <input type="checkbox"/> Long handled soft bristle brushes <input type="checkbox"/> Buckets / Plastic bowls <p><u>Water Sources/Containment Devices:</u> (use any type below)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Hoses with gentle flow, controlled nozzles with hot and cold water <input type="checkbox"/> Shower: <ul style="list-style-type: none"> . Single with flex head (minimal) . Multiple heads (recommended) <input type="checkbox"/> Plastic pallets to prevent slippage (minimum of 3) <input type="checkbox"/> Water containment/collection system <ul style="list-style-type: none"> . Wading pools, barrels and pump . Built-in decontamination collection and storage systems <p><u>Patient Privacy:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Gowns and/or suits for patient to don post decontamination <input type="checkbox"/> Towels and blankets <input type="checkbox"/> Self Decon “trash bag” kits (optional) <input type="checkbox"/> Tents or pre-fabricated decon tents <input type="checkbox"/> Modesty screens, portable screens <input type="checkbox"/> Ropes and tarps, barrier tapes <p><u>Miscellaneous Supplies:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Duct Tape <input type="checkbox"/> Scissors <input type="checkbox"/> Traffic cones <input type="checkbox"/> Megaphones <input type="checkbox"/> Plastic totes for hospital equipment <p><u>Patient Education:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Laminated decon instructions in different languages (community specific) <u>and</u> interpreter services

RECOMMENDED EQUIPMENT FOR PATIENT DECONTAMINATION	
LEVEL C	<p><u>Staff Personal Protective Equipment (PPE)</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Full face shield <input type="checkbox"/> Chemical-resistant gloves* <input type="checkbox"/> Chemical-resistant suit* <input type="checkbox"/> Waterproof chemical-resistant boots* <input type="checkbox"/> Respirator*: <ul style="list-style-type: none"> . Air Purifying Respirator (APR) . Powered Air Purifying Respirator (PAPR) with loose-fitting hood . Supplied Air Respirator (SAR) with loose fitting hood <input type="checkbox"/> Appropriate filter cartridge for APR or PAPR <p style="text-align: center;"><u>Equipment</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> All equipment listed in minimum level (Level D) <p>Plus:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ambulation assistance and transportation devices <input type="checkbox"/> Instant developer camera for evidence collection or identification of patient belongings. (optional) See evidence collection procedure for more information. <p>* Note: The selection of specific types of cartridges or filters, chemical resistant suits, gloves and boots is determined by the contaminant to which exposure is encountered. The type of equipment obtained and utilized by the hospital should be based on the hazard vulnerability analysis and community risk</p>
PREFERRED LEVEL EQUIPMENT	
LEVELS A & B	<p><u>Staff Personal Protective Equipment (PPE)</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Level A: <ul style="list-style-type: none"> . Vapor protective suit with hood . Self-Contained Breathing Apparatus (SCBA) <input type="checkbox"/> Level B: <ul style="list-style-type: none"> . Chemical-resistant gloves* . Chemical-resistant suit with hood* . Waterproof chemical-resistant boots* . SAR or SCBA * <p style="text-align: center;"><u>Equipment</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> All items listed in minimum and preferred levels (Levels C and D) <p>Plus:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Chemical resistant and water proof litters (i.e. Raven, Stokes, Morgue) or gurneys <input type="checkbox"/> Plastic (non-porous) backboard <p>* Note: The selection of specific types of chemical resistant suits, gloves and boots is determined by the contaminant to which exposure is encountered. The type of equipment obtained and utilized by the hospital should be based on the hazard vulnerability analysis and community risk</p>
SPECIALIZED LEVEL EQUIPMENT	

Recommendations for Staff Protection and Equipment Required for Chemical Decontamination In the Hospital Setting



Evidence Collection in Terrorism For Hospitals

The evidence collection appendix serves as a foundation for hospitals and first responders to collect and maintain the chain of evidence. In the event of a suspected or actual terrorist attack involving weapons of mass destruction, a variety of responders, ranging from health care providers to law enforcement and federal authorities, will play a role in the coordinated response. The identification of victims as well as the collection of evidence will be a critical step in these efforts.

The health care provider's first duty is to the patient; however interoperability with other response agencies is strongly encouraged.

- ~~///~~ The performance of evidence collection while providing required patient decontamination, triage and treatment should be reasonable for the situation
- ~~///~~ Information gathered from the victims and first responders may aid in the epidemiological investigation and ongoing surveillance

It is imperative that individual healthcare providers work with the local law enforcement agencies and prosecutors in the development and customization of these policies.

Recommended Procedure

I. Collection of belongings

1. Ambulatory and non-ambulatory patients who are able to undress without assistance will be directed to place their valuables (wallets, jewelry, cell phones, etc.) in a clear, pre-labeled, plastic re-sealable bag. Direct the person to place a form of picture identification in the bag so that it is visible from the outside. Assistive devices such as glasses, canes, hearing aids, etc. and car/house keys should be kept by the patient and be decontaminated with him/her.
2. Ambulatory and non-ambulatory patients who are able to undress without assistance will be directed to place their clothing in a pre-labeled paper bag. If the clothing is contaminated with chemical agent that may pose a risk of secondary contamination, the bag should be placed in a large clear, pre-labeled, plastic re-sealable bag. Patient and event information should be placed on the bag.

Recommendations for Staff Protection and Equipment Required for Chemical Decontamination In the Hospital Setting

3. Patient and event information to be included on the label should include the following:
 - Patient name
 - DOB
 - Medical record #
 - Date
 - Time
 - Amount and type of decontamination of clothing prior to placing in bag (if known)
 - Geographical site* where contamination occurred. (This information is critical to the epidemiological surveillance of the event and causative agent. Information may include proximity to the release site, location at time of the event, etc.)
4. Hospital staff that assist patients who are unable to undress or bag their own clothing and valuables should follow the same bagging and labeling procedures detailed above.
5. **If time and staffing allow**, a picture of the patient taken with an instant developing camera prior to clothing removal should be taken and attached to or inserted into the labeled bag. This will enhance identification of belongings with patients post event.
6. Hospital security personnel, hospital police officer or city police officer should oversee the collection of clothing and valuables. Efforts should be made to store each bag separately (i.e., not touching each other) in order to maintain the chain of evidence.
7. Release of patient belongings and valuables to law enforcement authorities should be according to local law enforcement and hospital policy.

II. Decontamination of Valuables and Belongings

1. In the event that law enforcement determines that the patient valuables and belongings are not needed as evidence, the property should be released to the patient upon discharge in accordance with hospital policy.
2. The designated decontamination leader will determine the need for decontamination of the clothing and valuables. If valuables and/or belongings are released to law enforcement, it will be their responsibility to decontaminate the articles.



HAZ MAT FOR HEALTHCARE

Management of the Contaminated Patient -Use of a Decon Resource Team

Overview: This document was created to address the issue of hospitals being able to provide chemical decontamination (including biological and radiological), whether it be the isolated victim or multiple victims from a mass casualty Hazardous Materials (Haz Mat) event. In the past this seemed like an overwhelming task due to the cost of equipment and training issues. The purpose of the Task Force was to look at the issue and develop a solution that was feasible and cost effective. We believe we have been able to accomplish this. Though there are still costs involved, we have reduced them as much as possible. The following are some of the ways this has been accomplished:

1. Using a regional (greater Sacramento Area) approach, creating the following benefits:
 - a. Greater purchase power when buying equipment.
 - b. Providing the opportunity to share equipment if needed.
 - c. Using a modular training program will provide uniform training.
 - d. Staff can attend the training at any facility (not just their own).

2. Deciding to use Supplied Air Respirators (SAR's) with a loose fitting hood instead of Self-Contained Breathing Apparatus (SCBA's).
 - a. Simpler and less intimidating for staff to use than SCBA's.
 - b. No fit testing required.
 - c. Able to use with facial hair and corrective eye wear.
 - d. Less potential for over exertion injuries.
 - e. Much less expensive (\$350.00 per person outfitted compared to \$2000.00 per SCBA's).
 - f. Multiple breathing air sources (Med air cylinders, hospital air, ambient air pumps).
 - g. Without an escape tank a SAR with a loose fitting hood is classified as Level C protection, but is estimated to provide an Assigned Protection Factor between 1,000 to 10,000.
 3. Working with the local Fire Department.
- Though this plan may not address 100% of all circumstances and situations, we feel that it will cover the vast majority of situations encountered in hospitals. It is a significant step from doing nothing because the problem was too overwhelming, to being able to do a lot to handle most situations.

This guideline and related Task Force documents are guidelines and for information. Each facility will need to review this guideline and determine if it is appropriate for their facility and make modifications as needed to be consistent with organization policies and applicable regulations/standards.

Issues to consider:

1. Use of SAR's and Med Air systems. The National Fire Prevention Association (NFPA) does not recommend using the "piped in or wall" Med Air for Personal Protective Equipment (PPE) respirator use due to the potential of interruption of patient use of Med Air. If you use "wall" Med Air you may need to check the system to guarantee non-interruption of patient use of Med Air. Ambient air pumps or compressors can also be used. Depending on the location of your Decontamination area, air pumps may be the most feasible solution.
2. Uncontained contaminated run off water. The hospital may be held liable if the environment (e.g., waterways) is contaminated. Would have to weigh out the risk of not performing decontamination. Each hospital should preplan to address collection of contaminated waste water, such as collecting in pools, or directing the run off to the sanitary sewer instead of the storm drain system.
3. Respiratory Protection Program. Personnel donning respirators need to be pre-identified and participate in the Respiratory Protection Program.

Who needs to be decontaminated? – Consider and weigh out the need for decontamination based on the symptoms, known contact, or a presence of an agent. If the agent is known – what are the characteristics of the agent? What are the chances of secondary contamination? Was decontamination accomplished prior to arrival at the hospital; and, was it adequate?
Risk communication and rumor control are essential.

External Notifications that may need to be made: **See Notification list**
911 (Fire, Law) Disaster Control Department of Health Services (hospital licensing)
Other as necessary (i.e. OES, National Response Center)

Potential Crime, Terrorist act or Weapons of Mass Destruction (WMD) act:

If there is anything suspicious about the circumstances of the event, you should consider it to be a criminal act. If it is a potential for Terrorism or a WMD act the local FBI should be contacted (See notification list). Attention should be given to evidentiary concerns, such as collection of clothing and personal effects, and attention given to victim statements. Be aware that more often than not, the victim who provides specific details on the substance (more then would normally be expected of an innocent civilian), is the perpetrator who inadvertently became a victim.

Notes:

‡ **At any point if your facility can't handle at a specified level – secure, contain, and call 911. (Safety, Isolate and Notify)**

‡ **Unless you know for sure that it is an isolated, single person event – should contact 911, Fire, Disaster**

Control Facility to provide a “heads up”, put others on the alert.

Emergency Decon: consideration to Life 1st, then Environment, then Property.

Information Resources: Examples include: Poison Control, ATSDR Medical Management Guidelines, Fire Dept., First Responder Operations (FRO) trained personnel. – can provide information on level of PPE needed.

Activate the Hospital Emergency Incident Command System (HEICS) –the size and nature of the event will determine to which level you activate HEICS, but an Incident Command (IC) approach should be established.

One to Five (1 to 5) Persons enter the Emergency Department (Ambulatory) -Directed Self Decon-

Operational Information	Team Needed	PPE Needed	Equipment Needed
<p>Known Substance: <u>Assumption:</u> Agent is identified (known). Action: Have patient Self Decon. Be prepared to assist if required.</p> <p>Unknown Substance: Same as Known Substance since Self-Decon will be performed.</p> <p>See Post Decon Procedures</p>	<p><u>Decon Triage Personnel to:</u> Triage Manage Airway, Breathing, Circulation (ABC's) Directed Self Decon</p> <p><u>Site Access Personnel to:</u> Establish & maintain perimeter</p> <p><u>Set Up / Support Personnel to:</u> Set up & tear down equipment. Contain, manage, & dispose of waste</p> <p>See Decon Job Action Sheets</p> <p>ALL of the above need to be FRA (First Responder Awareness) trained</p>	<p><u>Assumption:</u> NO direct patient contact will be made</p> <p>Standard Precautions / Splash Protection Face Shield Gown Gloves Booties</p> <p><u>Setting:</u> Well ventilated (not a regular room) Preferred - outdoors</p>	<p><u>Water Source/Collection</u> Water (tepid preferred) Shower (decon) Hose Collection pools Collection barrels</p> <p><u>Cleaning Supplies</u> Mild Soap Buckets, soft brushes Scissors</p> <p><u>Belongings Collection / ID</u> Patient ID bands Labels/ Sharpie pen Sealable plastic bags Paper bags</p> <p><u>Modesty/coverings</u> Gowns Blankets Modesty Screen or rope & blankets "Trash Bag Decon"</p> <p><u>Miscellaneous</u> Laminated instructions in the shower area (in multiple languages or pictures)</p>

One to Five (1 to 5) Persons enter at any other entrance (Ambulatory) -Directed Self Decon-

Operational Information	Team Needed	PPE Needed	Equipment Needed
<ul style="list-style-type: none"> ◆ As soon as discovered – have the person exit the same way they came, or through the closest exit if appropriate (to reduce spread of contamination). ◆ Escort to the designated decon. area (not through the hospital). ◆ Close down the contaminated area until someone can deem it safe. Haz Mat Coordinator will determine the steps to take. (See Termination Procedures) ◆ Call Security to secure area. ◆ Identify alternative entrance if needed. ◆ Observe for and isolate anyone who may have received secondary contamination. ◆ Lockdown all manners of ingress. <p>Known Substance: <u>Assumption:</u> Agent is identified (known).</p> <p><u>Action:</u> Have patient Self Decon</p> <p>Unknown Substance: Same as Known substance since Self-Decon will be performed.</p> <p>See Post Decon Procedures</p>	<p><u>Decon Triage Personnel to:</u> Triage Manage Airway, Breathing, Circulation (ABC's) Directed Self Decon</p> <p><u>Site Access Personnel to:</u> Establish & maintain perimeter</p> <p><u>Set Up / Support Personnel to:</u> Set up & tear down equipment. Contain, manage, & dispose of waste</p> <p>See Decon Job Action Sheets</p> <p>ALL of the above need to be FRA (First Responder Awareness) trained</p>	<p><u>Assumption:</u> NO direct patient contact will be made</p> <p>Standard Precautions / Splash Protection Face Shield Gown Gloves Booties</p> <p><u>Setting:</u> Well ventilated (not a regular room) Preferred - outdoors</p>	<p>Water Source/Collection Water (tepid preferred) Shower (decon) Hose Collection pools Collection barrels</p> <p>Cleaning Supplies Wild Soap Buckets, soft brushes Scissors</p> <p>Belongings Collection / ID Patient ID bands Labels/ Sharpie pen Sealable plastic bags Paper bags</p> <p>Modesty/coverings Gowns Blankets Modesty Screen or rope & blankets</p> <p>Miscellaneous Laminated instructions in the shower area (in multiple languages or pictures)</p>

Six or Greater (>6) Persons enter the Emergency Department “Mass Decontamination”

Operational Information	Team Needed	PPE Needed	Equipment Needed
<ul style="list-style-type: none"> ◆ These may be deemed as “Mass Decontamination”. ◆ The goal is provide rapid decontamination to large numbers (FRO Decontamination). ◆ Once the agent is identified, the course of treatment or decontamination may be changed. ◆ Attempt to contain decon water run off. ◆ Need to preplan to determine where sewer collection is versus Storm Drain system (Contact Local Publicly Owned Treatment Works). (If water can not be contained, it is preferred that it goes into the sewer system instead of the Storm Drain) <p>Known Substance: Assumption: Agent is identified (known).</p> <p>Action: Have patients Self Decon. Be prepared to assist if required. Supervise Self Decon to ensure adequate decontamination.</p> <p>Unknown Substance: Actions are the same as Known Substance, except that appropriate Resp and Skin protection must be used.</p>	<p>Option #1: Use Fire Engine as water source. Note: If there is a large community incident, Fire probably won't be available. ED RN – FRO (First Responder Operations) trained.</p>	<p>Assumption: NO direct patient contact will be made Standard Precautions / Splash Protection Face Shield Gown Gloves Booties</p>	<p>Clothing/ valuable bags Patient gowns Patient labels/ ID bands Modesty considerations, curtains, women vs men. Consider multi-language or illustrated, quick instructions</p>
<p>Option #2</p> <p>Multiple showers Minimum 1 minute. If possible or situation allows 15-20 min. (Tepid water is needed to prevent hypothermia)</p> <p><u>Decon Triage Personnel to:</u> Triage Manage ABC's Directed Self Decon</p> <p>continued</p>	<p>Assumption: Due to the numbers of victims, likelihood of direct contact is greater, so respiratory protection and chemical splash protection needed. Appropriate PPE – Depending on agent., up to Level B respiratory and skin protection</p>	<p>Multiple showers/ Shower head set up Clothing/ valuable bags Patient gowns Patient labels/ ID bands Tepid water Modesty considerations, curtains, women vs men Consider multi-language or illustrated, quick instructions</p>	

Operational Information continued	Team Needed	PPE Needed	Equipment Needed
<p>See Post Decon Procedures</p>	<p><u>Option #2 continued:</u></p> <p><u>Site Access Personnel to:</u> Establish & maintain perimeter. Consider accessing local Law Enforcement for support.</p> <p><u>Set Up / Support Personnel to:</u> Set up & tear down equipment Contain, manage, & dispose of waste</p> <p>ALL of the above need to be FRO (First Responder Operations) trained.</p> <p>ED RN – FRO trained ED MID Other resources if available</p>		

Non Ambulatory Patient(s)

Operational Information	Team Needed	PPE Needed	Equipment Needed
<ul style="list-style-type: none"> ◆ This is more labor intensive. ◆ Requires more staff, time, and space. ◆ Requires a flexible water source. ◆ Remember – decontamination may need to be performed on persons coming in contact with the patient (driver, passengers, staff contacting patient). ◆ Consider using “already contaminated persons” to handle the patient (move them) until staff can don PPE. ◆ Remember to isolate the transport vehicle. <p>Known or Unknown Substance:</p> <p><u>Action (Summary):</u></p> <ol style="list-style-type: none"> 1. Don proper PPE: Known substance – agent specific level of protection. Unknown substance – Appropriate resp & skin protection. 2. Consider ABC’s and C spine needs. 3. Take patient to Decon Area (must be well ventilated). 4. Place patient on appropriate decon table (guerney, morgue table, backboard on buckets/folding ladder, Stokes litter, etc.). <p>Continued</p>	<p><u>Decon Triage Personnel to:</u> Triage Manage ABC’s</p> <p><u>Site Access Personnel to:</u> Establish & maintain Perimeter</p> <p><u>Set Up / Support Personnel to:</u> Set up & tear down equipment Contain, manage, & dispose of waste</p> <p>ALL of the above need to be FRO (First Responder Operations) trained.</p> <p>Use Buddy system and backup rescue personnel.</p>	<p>Appropriate PPE – Depending on agent, up to Level B respiratory and skin protection</p>	<p><u>Water Source/Collection</u> Water (tepid preferred) Shower (decon) Flexible water source Hose Collection pools Collection barrels</p> <p><u>Cleaning Supplies</u> Mild Soap Buckets, soft brushes Scissors Decon table or equiv.</p> <p><u>Belongings Collection / ID</u> Patient ID bands Labels/ Sharpie pen Sealable plastic bags Paper bags</p> <p><u>Modesty/Coverings</u> Gowns Blankets Modesty Screen or rope & blankets “Trash Bag Decon”</p> <p><u>Miscellaneous</u> Laminated instructions in the shower area (in multiple languages or pictures)</p>

Non Ambulatory Patient(s), continued

<ol style="list-style-type: none"> 5. Rinse <i>May reverse order depending on type and amount of agent.</i> 6. Remove clothes <i>Is it a powder, will you spread it more by wetting it?</i> 7. Properly bag clothes. 8. Decon – Rinse, brushing. Don't forget the back. 9. Final rinse. 10. Cover the patient. 11. Re-triage if needed. 12. Move to treatment area or Safe Haven. <p>◆ If there is more than 1 patient, Triage who needs to be Decon'd first.</p> <p>See Post Decon Procedure</p>			
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Emergency Department Contaminated

Operational Information

- ◆ Seal off – Lock down. See Facility's Access Control procedures.
- ◆ Don PPE – if you're not contaminated.
- ◆ Remove patients/ staff not likely contaminated.
 Consider airborne versus contact:
 May want to place these people in a separate area from the truly non-contaminated.
 Observe for symptoms of contamination.
- ◆ Treat contaminated staff and patients utilizing the appropriate procedure listed above (ambulatory, nonambulatory).
- ◆ Once persons are removed from the contaminated area – DO NOT reenter until area cleaned and cleared. (See Termination Procedures).
- ◆ Consider activation of Alternative Treatment Areas.

Post Decontamination Procedure

Operational Information

After Decontamination:

- ◆ Place patient in Safe Haven.
- ◆ Washing with soap and water and a thorough rinsing provides a high level of contaminant removal. But each patient should be examined to ensure adequate contaminant removal (consider long hair, ears, toes and other potentially concealed areas).
- ◆ Triage should be based on:
 - a. Characteristics of the chemical
 - b. Concentration of chemical
 - c. Amount of exposure
 - d. Length of exposure
 - e. Route of exposure
 - f. Parts of the body affected
 - g. Signs and Symptoms exhibited.
- ◆ Of the people who need further decontamination, the Triage RN will determine if there is a medical priority to who is done 1st.

Operational Information

Termination Procedures

Purpose: To return facility to normal operations.

Who can make the determination about proper clean up, disposal, or notifications?

One or more of the following people:

1. Facility Environmental Health & Safety Officer. Other facility personnel as needed such as: Haz Mat Coordinator, Nuclear
2. Fire Department (Haz Mat Team)
3. County Environmental Health or Management
4. Contracted Haz Mat Clean up Service

Information Resources: Examples include - Poison Control, Chemtrec, the Manufacturer, Ag Department, Fish & Game

- Consult with Law Enforcement if there is a potential for crime evidence.

Actions to Take:

1. Contain/ secure the following items (in appropriate containers, i.e. sealed bags, barrels) until disposal or cleaning needs are determined by the decision makers listed above:
 - a. Contaminated clothes
 - b. Personal belongings
 - c. Contaminated water
 - d. Contaminated equipment (Decontaining equipment and Patient care equipment)
 - Will need to make all efforts to clean/return personal items that can safely be returned (keys, jewelry, money, credit cards). Make records of what can't be returned (amounts of money, credit card numbers).
 - Need to pre-plan for how belongings are going to be labeled (water proof).
2. Facility contamination (Inside & Outside):
 - Area should be secured until deemed safe or cleaned.
 - The decision makers listed above will evaluate the facility based on the level of contamination and type of agent.

continued

Termination Procedures, Continued

Operational Information

3. If there was uncontrolled run off or possible uncontrolled run off – make appropriate notifications. The above decision makers in collaboration with Fish & Game, EPA, or Publicly Owned Treatment Works (POTW) (as needed) will determine actions that need to be taken.
4. Decontaminate the Decon Team – perform decontamination starting with the most contaminated first. Then the last will Self Decon.
5. Initiate Staff Monitoring in collaboration with Employee Health. Based on the characteristics of the contaminant, consider prophylactic needs, base line health data, and long term monitoring.
6. Confirm that all required and needed notifications (Internal and External) have been made.
7. Stand down Security and discontinue Lock down. This may be done in phases. Must secure contaminated items until removed.
8. Restock Decontamination Equipment and Patient Care Equipment.
9. Critical Incident Stress Debriefing (CISD) – Need a rapid defusing for staff just after the incident, and then a full CISD (if still needed) in a timely manner.
10. Debriefing of the Incident:
 - Quick, basic debriefing of Incident Command staff and other departments involved, before disbanding the Command Center.
 - Full debriefing in a timely manner. It may be next day or two depending on the size of the event and length of clean up.
11. Document, Document, Document – List all actions taken, decisions made, and other information.
Consider: Risk Management issues, Financial issues, and Regulatory issues.

Haz Mat Notification List (SACRAMENTO COUNTY)

Minimum mandatory notifications Other possible notification or request for aid		
Agency	Type of Event/ Resource Available	Telephone #
LOCAL:		
Fire Department – Haz Mat Team		911
Disaster Control Facility (UCDMC)		734-5669
Law Enforcement		911
Haz Mat Administering Agency	(Haz Waste-Business Environmental Resources Center)	(916) 364-4110
County OES	Acts as local disaster coordinator	(916) 874-4670
County Agriculture Department	Provides technical advice, may assist with clean up	(916) 875-6913
County Air Pollution Control District or Air Quality Management District	Technical expertise regarding dispersion patterns for airborne pollutants. (Air Quality Resource Center)	(916) 364-4110
County Health	Provides information resources.	(916) 875-5877
County Schools	If release within ½ mile of schools.	
Publicly Owned Treatment Works (POTW)		
STATE:		
State OES Warning Center	They will contact the state agencies. Immediate verbal; any significant release or threatened release of a hazardous material.	(800) 852-7550 or (916) 262-1621
CHP	Immediate verbal; must be notified for spills on those highways under CHP jurisdiction.	911
California Air Resources Board	Incident that threatens to adversely affect air quality.	(916) 322-2990
California Department of Food and Agriculture	Immediate verbal; incident involving pesticide or agricultural chemical.	(916) 654-0462

Haz Mat Notification List, Continued
(Sacramento County)

Agency	Type of Event/ Resource Available	Telephone #
STATE: continued California Department of Fish and Game	Immediate verbal; incident which impacts or threatens state waters. (Call OES)	(800) 852-7550 (916) 654-1621
California Water Quality Control Board (Regional)	Waste discharges or proposed discharges that threaten or may impact water quality. (This includes ground and surface water impacts)	(916) 255-3000
California Department of Health Services	Immediate verbal; major hazardous materials release affecting large populations, radiation incidents.	(916) 445-4171
California Department of Toxic Substance Control	Hazardous waste tank system releases; secondary containment releases.	(916) 324-1826
Cal/OSHA	Immediate verbal; Exposure to a regulated carcinogen or serious injury, illness or death of an employee during any work activity, including those associated with hazardous materials incidents.	(916) 263-2800
Delta Keeper	Investigates reports of contamination of delta waters and local waterways.	(209) 464-5090 (800) 533-7229
FEDERAL:		
National Response Center	Must be notified of oil spills, hazardous chemical releases, pipeline accidents, transportation accidents involving a hazardous material or oil, a release of radioactive material, etiological or hazardous biological material in excess of federal reporting quantities.	(800) 424-8802
U.S. Coast Guard		M.S.O. Alameda (510) 437-3073

Agency	Type of Event/ Resource Available	Telephone #
FEDERAL: continued		
U.S. EPA (Region IX)	Notice of oil discharge or release of a hazardous substance in an amount equal to or greater than the reportable quantity must be made. (For community environmental issues, contact your local or state Environmental Office.)	(415) 744-1702
FBI (suspected terrorist or WMD act only)		(916) 481-9110
PRIVATE:		
CHEMTREC	24-hour public service provides information for spill, leak, exposure, or fire control measures.	800-424-9300
Local Clean up Company		
Regional Poison Control Center	Provides toxicological information concerning hazardous material incidents.	800-876-4766
Underground Services Alert	Provides information regarding location of underground structures which could impact the response to a hazardous materials incident.	800-642-2444

HHC

Healthcare Hazard Control

Advisory**Personal Protective Equipment 3.5*****ECRI ADVISORY*****Selecting Personal Protective Equipment
for Chemical and Bioterrorism
Preparedness: Risks and Costs**

Healthcare facilities have many decisions to make in deciding how to budget their share of the \$135 million dollars recently appropriated by Congress to hospitals for chemical and bioterrorism preparedness. This is particularly true in selection, use, and maintenance of appropriate personal protective equipment (PPE) for frontline healthcare worker use in emergency response.

A thorough understanding of the inherent hazards and limitations associated with the various types of respiratory protective devices, as well as with chemical-resistant suits, gloves, and boots, is necessary for a facility to select the most appropriate PPE for the protection of patients and staff. ECRI issues the following overview and recommendations regarding PPE and respiratory protection for healthcare workers involved in emergency response. Level A protection, which provides the highest degree of respiratory and skin protection by providing the user with a fully encapsulated and chemically impervious environment, is not typically recommended for frontline healthcare workers in emergency response and so will not be addressed here.

Level B Respiratory Protection

The Occupational Safety and Health Administration (OSHA) requires a Level B ensemble as the *minimum* level of protection for first responders, including frontline healthcare workers, *if the chemical or biologic agent and/or exposure concentration is unknown*. Level B protection includes a splash protective suit (e.g., Saranex®) and a positive-pressure supplied-air respirator such as an airline respirator or self-contained breathing apparatus (SCBA). Level B can be downgraded to Level C protection, in which full- or half-face air-purifying respirator use is recommended, after the contaminant and concentration has been identified.

The use of PPE, particularly Level B, can present a significant risk to users, particularly those who are not properly trained and medically evaluated, fit tested, and approved to

use the equipment under actual hazardous conditions. Employee health hazards associated with PPE and respirator use include increased cardiac demand and respiratory fatigue, increased body temperature and heat stress, claustrophobia, and posttraumatic stress disorder. There are also ergonomics and human factors issues to consider, including prolonged reaction and performance time, loss of balance, and risk of lower back injury. A brief discussion of the various types of respirators and how they work will be useful in understanding the risks involved in their use. Recommendations will be offered to help healthcare facilities establish measures to mitigate these risks to healthcare workers.

Supplied-Air Respirators

There are two major subdivisions of supplied-air respirators: the airline respirator and the SCBA. Although both supply Grade D air (the purity level of which is defined by the Compressed Gas Association in its publications CGA G-7 "Compressed Air for Human Respiration" and CGA G-7.1 "Commodity Specification for Air") or better, can be fitted with a tight or hood-style facepiece, and have characteristic OSHA and National Institute for Occupational Safety and Health (NIOSH) requirements, each has inherent attributes and limitations that can affect a healthcare worker's ability to respond to an emergency situation.

Airline Respirators. Healthcare workers using an airline respirator are on a tether (the airline) that is attached to a freestanding air supply from an air pump, compressor, or compressed gas cylinder. Air delivery can be accomplished through demand, pressure demand, or continuous flow. Demand units provide air upon inhalation, creating negative pressure within the mask, which conserves air but requires more physical exertion and can allow toxicants in the ambient atmosphere to leak into the mask at the facial seal. Pressure

For more information about this topic and other related topics, go to our Web site at <http://www.ecri.org>.



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March 2002

demand systems are also activated by inhalation from the user; once activated, however, positive pressure is maintained in the facepiece and is increased with user inhalation. Continuous-flow systems provide 4 to 15 cubic feet per minute airflow continuously to the user upon activation.

Air pumps and compressors can fail in contaminated atmospheres. To protect users in the event an air supply fails, airline respirators should be fitted with an appropriate air-purifying cartridge and/or a supplemental air bottle for escape. Only air compressors that supply the user with Grade D breathing or better should be used. Compressed gas cylinders must be secured to the wall or in an appropriate free-standing cart and be equipped with reliable regulators. Airline respirator users must also exercise caution because the airline itself limits movement somewhat and can present a tripping hazard if not configured properly. Airline respirators are probably best suited for situations in which emergency patient care is limited to a small area, such as in a decontamination or isolation/treatment room.

Self-Contained Breathing Apparatus. The two major types of SCBAs are open and closed circuit. Open-circuit systems usually consist of a Grade D tank of compressed air that lasts 30 to 120 minutes and exhausts the exhaled air directly into the atmosphere. Closed-circuit SCBAs are usually smaller and are comprised of highly compressed or liquid oxygen and a device that removes carbon dioxide from the exhaled air within the unit and adds oxygen to replace the oxygen that has been used. Closed-circuit SCBAs typically allow up to four hours of use. SCBA units approved for firefighting can be either open or closed circuit and can weigh 45 pounds or more. SCBAs not approved for firefighting are open circuit and typically weigh approximately 20 to 25 pounds.

Although an SCBA with a tight-fitting, full facepiece has the highest NIOSH-approved protection factor (APF),* these devices are costly and are not without inherent hazards and limitations. SCBA use can cause incomplete gas exchange and can make breathing more difficult, which may lead to respiratory muscle fatigue and chest compression. An SCBA also adds a considerable amount of weight to a healthcare worker's body, posing an ergonomic challenge to the user, particularly when handling and lifting incapacitated patients. Worn over extended periods, the weight of the

* The APF of a respirator reflects the level of protection that a properly functioning respirator would be expected to provide to a population of properly fitted and trained users.

SCBA can cause shoulder and back muscle fatigue and lower back injury.

An SCBA also places special demands on motor skills, affects posture, and changes the user's center of gravity, all of which can lead to loss of balance and adversely affect performance of patient care. As is the case with many hooded or full-face respirators, the SCBA's user's visual field is limited to varying degrees, which further affects the user's postural control and balance. Depending on the particular SCBA, other inherent hazards include fire, explosion, compression hazards of compressed air, pinch points when attaching cylinders and hoses, and failure of integral parts such as the face lens. For these reasons, healthcare facilities should carefully weigh their need for an SCBA against the inherent hazards associated with its use, as well as consider the initial and maintenance costs of the apparatus, ease of use, fit testing, and training before purchasing such equipment. If SCBAs are deemed necessary, facilities should look for lightweight pressure demand units that can be donned, removed, and stored easily.

Level C Respiratory Protection

As noted earlier, Level C protection entails use of a full- or half-face air-purifying respirator once the contaminant and its concentration have been identified.

Air-Purifying Respirators

Air-purifying respirators remove contaminants by filtering air in the user's breathing zone instead of supplying air from a remote source such as an air tank or compressor. Air-purifying respirators can filter particulate, chemical vapors and mists or a combination of both. Filtering facepiece particulate respirators are designated as N (not resistant to oil), R (resistant to oil), or P (oil proof) and have efficiencies of 95%, 99%, and 99.97%.

The N95 Particulate Respirator. The N95 respirator is commonly used in healthcare settings as part of standard precautions against transmission of airborne infections. This model affords protection from infectious aerosols (e.g., tuberculosis) and particulate but is not effective in atmospheres that have been contaminated with volatile organic chemical compounds and can be more easily dislodged and wetted during decontamination and treatment activities.

Air-Purifying Respirators. Air-purifying respirators fitted with high-efficiency particulate air (HEPA) cartridges or canisters can protect against particles such as biological spores, asbestos fibers, dusts, and fumes. HEPA cartridges remove 99.97% of particles with an average diameter of 0.3 microns.

Air-purifying respirators fitted with chemical-specific cartridges or canisters provide protection against chemical vapors and mists. Combination cartridges and canisters combine the protective characteristics of HEPA filtration and chemical-specific capture. In either case, air-purifying respirators are available in half-face and full-face units and have an APF of 10 and 50, respectively.* Those whose function depends solely on the inhalation and exhalation of the user are considered negative-pressure air-purifying respirators. As with other respirators, these air-purifying respirators can increase cardiopulmonary strain and can cause user fatigue.

Powered Air-Purifying Respirators (PAPRs). PAPRs also filter the ambient air, but these units use a battery-powered motor and blower to supply air to the user through a hose to a half- or full-face facepiece or loose-fitting hood/helmet. The battery life is typically 8 to 10 hours using nickel-cadmium (NiCd) or lithium technology. The blower produces a positive pressure in the face or headpiece, lowering the likelihood of inward leakage, providing a higher degree of protection (an APF between 25 and 50 according to NIOSH and as much as 1000 according to manufacturers), reducing cardiopulmonary strain and fatigue, and affording the user greater cooling capacity. PAPRs with highly chemical-resistant hoods (e.g., butyl rubber) are typically much easier to take on and off, are versatile for emergency response because they can often be fitted to an airline or supplied air tank, and are more convenient because they do not require user fit testing.

Protective Clothing

Certain protective clothing offers protection against particulates and fibers, while others offer chemical resistance. Risks are associated with each type. Level B suits are spun-bonded and coated with polyethylene, polyvinyl chloride, or Saran, for example, providing good chemical resistance but posing considerable risk for the user, who may experience heat stress. Uncoated spun-bonded garments such as those used in Level C are good for particulate and fiber exposure, are breathable, and reduce the likelihood of heat stress but are normally not chemical or liquid resistant. Other integral components of protective clothing including chemical-resistant gloves and boots can also increase body temperature and sweating, contributing to heat stress, dehydration, skin irritation, rashes, and fungal infections.

* An APF of 10 for a respirator means that a user could expect to inhale no more than one-tenth of the airborne contaminant present.

Staffing

A team of appropriately trained and equipped healthcare workers who can safely triage, decontaminate, and treat victims without endangering themselves and contaminating the facility should be maintained on-site. At a minimum, this would require that several staff members on each shift be provided with and trained in the use of the appropriate equipment for Level B protection. Because of the characteristics of PPE use that can affect healthcare workers physical and mental status in emergency situations, healthcare facilities should train sufficient numbers of additional staff in PPE use to allow for rotation in and out of the area during emergency operations. The OSHA requirement that there be a one-to-one correspondence between responders in Level A and their backup is an equally prudent practice for Level B response as well and should be strongly considered.

ECRI Recommendations

- Account for human factors in selection and purchase of PPE and respiratory protection, such as user comfort, body burden, and susceptibility to heat stress, as well as considerations such as contaminant resistance properties of protective ensembles, respirator class, APF, and the configurations and shelf life of cartridges.
- Account for the fact that each person slated to use tight-fitting respirators must be, at a minimum, qualitatively fit tested for *each specific respirator model and size* of the units potentially used, requiring approximately 10 to 15 minutes per respirator per person for fit-testing to be performed. Non-tight-fitting units such as hooded PAPRs do not require fit testing.
- Train healthcare workers how to mitigate potentially harmful effects of PPE use, including use of controlled breathing techniques, recognition of signs and symptoms of heat stress, the need for rest periods and hydration, emergency procedures, practical exercises, and fitness tips in addition to PPE operation and maintenance, inspection, cleaning and decontamination of equipment, donning and doffing procedures, safety checks, checking end-of-service-life indicators, and changing of air-purifying respirator air cylinders or cartridges.
- Design and conduct disaster drills so healthcare workers don and remove PPE to experience conditions that simulate some of the physical and mental challenges of conducting patient care tasks while wearing each PPE ensemble.

- Establish a medical surveillance program for personnel responsible for PPE use for decontamination, triage, and first response for collection of baseline medical data for future comparison. Include the following:
 - Medically evaluate their physical and mental fitness for duty, including assessment of the ability to work extended periods in Level B ensemble.
 - Conduct physical exams to note susceptibility factors (e.g., obesity) and any physical limitations to wearing PPE, such as facial configurations (e.g., scarring, facial hair) that would preclude an adequate seal for use of tight-fitting facepiece respirators.
 - Use occupational and medical history questionnaires to assess (1) prior occupational exposure to nuclear, biological, chemical, and physical agents; (2) past illnesses; (3) atopic diseases (e.g., eczema, asthma, lung and cardiovascular diseases); (4) symptoms (e.g., shortness of

breath, labored breathing with exertion, high blood pressure, heat intolerance, chest pain, chronic respiratory symptoms); (5) sensitivity and/or susceptibility to certain substances; and (6) nonoccupational factors including lifestyle habits and hobbies.

- Develop a heat stress program for emergency response based on current OSHA recommendations (available on the Internet at www.osha.gov), and ensure that supplies of potable water are available for healthcare workers to replenish fluids during emergencies.

This advisory was prepared by ECRI's Center for Healthcare Environmental Management (CHEM), a membership program that provides information, education, and professional certification to healthcare environmental health, safety, and security managers. This advisory is available on the ECRI Web site (<http://www.ecri.org>). ♦

United States
Environmental Protection
Agency

Office of Solid Waste
and Emergency Response
(5104)

EPA 550-F-00-009
July 2000
www.epa.gov/ceppo/



FIRST RESPONDERS' ENVIRONMENTAL LIABILITY DUE TO MASS DECONTAMINATION RUNOFF

The Environmental Protection Agency (EPA) is issuing this alert as part of its ongoing effort to provide information on environmental issues related to biological, chemical, and nuclear terrorist incidents. EPA publishes *Alerts* to increase awareness of possible hazards and environmental concerns. It is important that SERCs, LEPCs, emergency responders and others review this information and take appropriate steps to minimize risk.

PROBLEM

On April 19, 1999, the Team Leader of the Chemical Weapons Improved Response Team (CWIRT), U.S. Army Soldier and Biological Chemical Command sent a letter to EPA raising issues concerning first responders' liability during a weapons of mass destruction (WMD) terrorist incident. Specifically, the CWIRT asked about the first responders' liability for spreading contamination while attempting to save lives.

Environmental liability resulting from critical lifesaving actions may seem unlikely, but could be a serious concern for many first responders. The question is: Can emergency responders undertake necessary emergency actions in order to save lives in dire situations without fear of environmental liability even when such emergency actions have unavoidable adverse environmental impacts? This concern is not limited to WMD terrorist incidents, it has

and frequently is discussed in the hazardous materials response community.

THE NERVE AGENT DRILL

The federal government recently sponsored a multi-agency drill based on a simulated nerve-agent attack. The release of the nerve agent resulted in hundreds of simulated casualties who survived the initial terrorist attack. The hazmat team had to rescue and decontaminate these "survivors" before they could receive medical attention. The hazmat team identified the need to collect the water used to decontaminate the victims (deconwater) to avoid a release to the environment. During the drill, these very capable, well-equipped, well-intentioned, professional hazmat teams delayed their initial entry for more than one hour, awaiting the arrival and set-up of pools to collect the deconwater. While the actor-survivors were dying a slow, painful, convulsive death, state and federal officials were debating and insisting that deconwater had to be collected for proper disposal. By the time the rescuers set up the holding pools and entered the site, nearly 90 minutes later, the "survivors"

broad implications for our National Response System (NRS)

CHEMICAL SAFETY

ALERT

First Responders' Environmental Liability due to Mass Decontamination Runoff July 2000

had expired. The contaminated water was collected but the “victims” died.

GOOD SAMARITAN PROVISIONS

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section § 107 (d) Rendering Care or Advice, addresses this issue. Section 107 (d) (1), often known as the “good Samaritan” provision states: “No person shall be liable under this sub chapter for costs or damages as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the National Contingency Plan (NCP) or at the direction of an on-scene coordinator appointed under such plan, with respect to an incident creating a danger to public health or welfare or the environment as a result of any releases of a hazardous substance or the threat thereof.” This provision does not preclude liability for costs or damages as a result of negligence. Releases of chemical and biological warfare agents due to a terrorist incident are considered hazardous materials incidents and therefore CERCLA §107 (d) (1) could apply, to the extent that there is a release or threatened release of a hazardous substance.

In addition, §107(d)(2) provides that state and local governments are not liable under CERCLA “as a result of actions taken in response to an emergency created by the release or threatened release of a hazardous substance generated by or from a facility owned by another person.” Section 107(d)(2) would insulate state and local governments from potential CERCLA liability arising from first responder actions. **However, the provision does not apply to costs or damages caused by “gross negligence or intentional misconduct by the state or local government.”**

During a hazardous materials incident (including a chemical/biological agent terrorist event), first responders should undertake any necessary emergency actions to save lives and protect the public and themselves. **Once any imminent threats to human health and life are addressed, first responders should immediately take all reasonable efforts to contain the contamination and avoid or mitigate environmental consequences.** EPA will not pursue enforcement actions against state and local responders for the environmental consequences of necessary and appropriate emergency response actions. First responders would not be protected under CERCLA from intentional contamination such as washing hazardous materials down the storm-sewer during a response action as an alternative to costly and problematic disposal or in order to avoid extra-effort.

OTHER LIABILITY ISSUES AND STATE TORT LAWS

EPA cannot prevent a private person from filing suit under CERCLA. However, first responders can use CERCLA’s Good Samaritan provision as defenses to such an action. First responders could also be subject to actions under other laws, including state tort laws. A state’s tort law allows individuals and businesses to seek compensation for losses or harm caused by another. The extent of tort liability of a state or local governmental jurisdiction, as well as individual employees or representatives of that jurisdiction, is established by the tort law of each state. The liability of governmental jurisdictions and their employees may be shaped by factors such as negligence, statutory and discretionary immunity, etc. **First responders should consult legal counsel in their state to discuss authority, status as an agent of the state, immunities, and indemnification.**

First Responders' Environmental Liability due to Mass Decontamination Runoff July 2000

**FEDERAL SUPPORT DURING
A WMD INCIDENT**

Contaminated runoff should be avoided whenever possible, but should not impede necessary and appropriate actions to protect human life and health. **Once the victims are removed and safe from further harm and the site is secured and stable, the first responders should be doing everything reasonable to prevent further migration of contamination into the environment.**

First responders should involve state and federal officials as soon as possible to reduce potential liability concerns. Under CERCLA, the Federal On-Scene Coordinator (FOSC) can determine which environmental regulations are applicable (or relevant and appropriate) to any removal response and may further determine that any such environmental regulation is impracticable to achieve depending on the exigencies of the situation. If the FOSC determines that it is impracticable to comply with any particular environmental regulation, then the responders (local, state, Federal or responsible party) do not have to comply with that particular environmental regulation. **By involving FOSC, first responders can substantially reduce their potential liability.**

In addition, FOSCs have an expanse of resources under the NRS to support state and local responders in determining a solution which best addresses protectiveness of human health and the environment. Under the NRC, the FOSC can provide invaluable assistance in determining clean-up and decontamination needs, health criteria and appropriate clean-up protocols as needed. FOSC support is even more critical in the aftermath of a WMD terrorist attack when critical post-emergency actions such as agent identification, crime scene sampling, crime scene preservation, and long-term risk evaluation are also being

conducted.

PRE-PLANNING IS KEY!

It may not be technically feasible to contain all the runoff resulting from a WMD incident, but emergency responders may be able to reduce its impact to the environment by pre-planning. Responders can maximize local resources by using existing response mechanisms as much as possible. Local Emergency Planning Committees (LEPCs) are a good starting point. LEPCs are established under the Emergency Planning and Community Right-to-Know Act to develop local governments' emergency response and preparedness capabilities through better coordination and planning, especially within the local community. LEPCs include elected officials, police, fire, civil defense, public health professionals, environmental, hospital and transportation officials, who can work together creatively using available resources to minimize the environmental impact of WMD incidents.

For More Information.....

**Contact the Emergency Planning and
Community Right-to-Know Hotline**

**(800) 424-9346 or (703) 412-9810
TDD (800)553-7672**

**Monday -Friday, 9 AM to 6 PM, EASTERN
TIME**

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